2166-01286

3200 San Fernando Road, Los Angeles, CA 90065 (213) 258-2777

CalMat Properties Co.

October 27, 1988

United States Environmental
Protection Agency Region IX
215 Fremont Street
San Francisco, CA 94105

Attention: Alisa Greene/Patti Cleary

Response Rely T-4-1

This response shall not be deemed an acknowledgment or admission that CalMat Co. generates or has generated or otherwise handled "hazardous waste and or hazardous substances."

If there are any clarifications or further information needed please contact my office, CalMat Co. 3200 San Fernando Road, Los Angeles, CA 90065.

Sincerely,

George Cosby

George Cosby
Vice President

GC:oc
Enc.

AFFIDAVIT

A diligent record search has been completed by CalMat Co. Except for the officer executing this affidavit, there are to the knowledge of CalMat Co. no employees or former employees who have knowledge of operations, chemical use and storage, and business practices of the landfill operation. All information responsive to the request revealed by the above mentioned search has been forwarded to the Agency, or will be forwarded, as noted in the response.

CalMat Co.

by: George Cosby

GEORGE COSBY

Vice President

CalMat Properties Co.

George Cosby
Vice President

3200 San Fernando Road, Los Angeles
CA 90065 (213) 258-2777

CalMat Properties Co.

RESPONSES TO EPA

REQUIREMENT FOR INFORMATION

FOR CALMAT PROPERTIES

10-26-88

CalMat Properties Co.

Request:

1. A description of the purpose and operations of your facility including, but not limited to, a detailed description of any hazardous waste storage, treatment, or disposal operations. Include the dates of operation.

Response:

No hazardous waste operations have been conducted on this site by CalMat.

Request:

2. Please provide us with the following information regarding any municipal trash or other non-manifested materials which were taken to your landfill during its operation:

   (a) The name of the city, refuse collection service, company or individual who generated or brought the material to the landfill (if a collection service brought material to the landfill on behalf of a city, please provide the names of both entities, and indicate their relationship):

   (b) The volume or amount of the material;

   (c) The amount billed and/or paid for the disposal of each material at the landfill;

   (d) The period of time during which each entity disposed of such material at the landfill and the frequency of disposals (e.g., weekly, ten-times per day, etc.); and

Response:

To its knowledge CalMat has none of the requested information. Operations of refuse disposal on the site were conducted under a Royalty Agreement by L.A. By Products Co.

Claude Van Gorden
L.A. By Products Co.
1810 East 25th St.
Los Angeles, CA 90058

CalMat believes the requested information may be in the possession of L.A. By Products Co.

CalMat Properties Co.

Request:

3. Any photographs, maps, diagrams regardless of their date, which show areas where hazardous substances or hazardous wastes have been or may be located.

Response:

None - No hazardous wastes have been disposed on this site.

Request:

4. A description of past and present disposal practices of hazardous substances and hazardous wastes at your facility.

Response:

To the best of CalMat's knowledge none.

Request:

5. Locations and detailed descriptions of all monitoring wells, supply wells, injection wells, and underground tanks at your facility.

Response:

Monitoring wells are shown in the accompanying SWAT report. There are no water supply wells. There are no injection wells. There are no known underground tanks at the Hewitt site.

Request:

6. All analyses from sampling of monitoring and supply wells, underground tanks, soil samples, and soil-gas sampling conducted at your facility. Please include any reports written by consultants(s) about these sample analyses.

Response:

Attached are all monitoring results taken from the monitoring network, as well as soil, air, and soil-gas sampling done as part of the SWAT program. The entire reports are included as well as separate analyses.

CalMat Properties Co.

Request:

7. Are you or your consultants planning to perform any investigations of the soil, water (ground or surface), geology, geohydrology, or air quality on or about the site? If so, please describe the planned investigations(s).

Response:

The SWAT program is currently underway at the site. This testing program is mandated by the Calderon Act and the site is in Rank 3. The final results and conclusions of the SWAT program will be available after January 1989.

Request:

8. A list of all current and former employees, agents, contractors, consultants, company officers, and other personnel who may possess knowledge or information relevant to this inquiry. This list should include each individual's name, address, telephone number, and job title or function.

Response:

All waste disposal personnel were employed by L.A. By Products Co.

Request:

9. Length of time your company has been at the site location and any information you have regarding former occupants of this location and their hazardous waste practices.

Response:

Ownership has been since 1904. No hazardous waste practices have taken place on this site.

CalMat Properties Co.

Request:

10. Any information regarding use and disposal of chlorinated solvents by any person or business in the San Fernando Valley.

Response:

No information is known at present.

Request:

11. A descriptive list of all insurance policies held by your company. The description should include the dates during which each policy was in force, the general type of policy (e.g., comprehensive, general liability, automobile), the insurance company issuing the policy, the policy number, and any specific provision of the policy which may relate to claims for environmental damages.

Response:

Detailed list to follow.

Request:

12. A detailed description of all hazardous substance and hazardous waste spills, leaks, and incidents, as well as any clean-up actions undertaken during the history of your facility's operation.

Response:

No knowledge of such spills, leaks or incidents.

CalMat Properties Co.

Request:

13. An audited set of financial statements which includes a Statement of Financial Position/Balance Sheet, Income Statement, and Statement of Changes in Working Capital, and any other supplementary information for your company's most recent fiscal year.

Response:

See Financial Reports enclosed

Request:

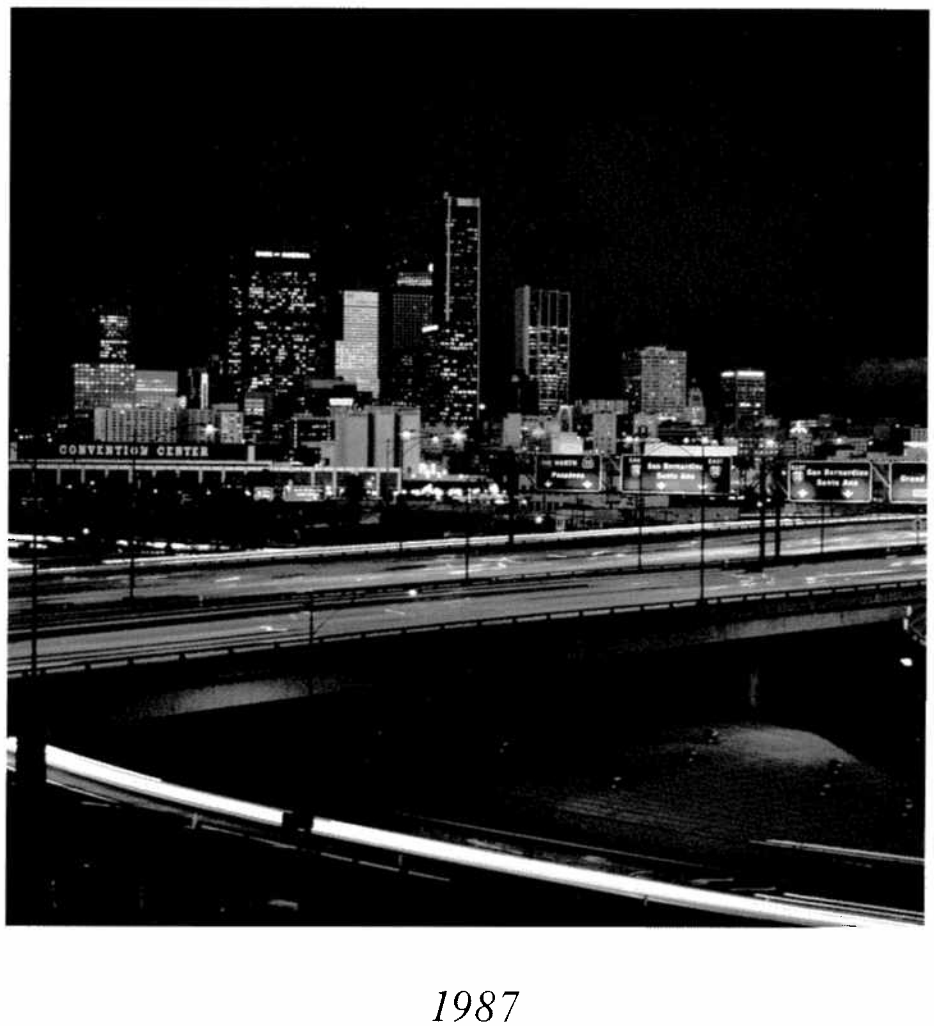
14. Are you owned by another corporate entity as a subsidiary, division, or otherwise? If so, list owner(s).

Response:

CalMat Co. is ultimate parent entity.

CalMat Co.

Providing the Ingredients for Growth



1987 Annual Report

About Our Annual Report

This year's Annual Report focuses on the diverse uses of CalMat's products in our complex society and the strength of the Company's growing markets.

Table of Contents

Corporate Profile

CalMat Co. markets its products in the major population centers of the Southwest. Greater Los Angeles, San Diego, Phoenix and Tucson, are among the fastest growing areas in the United States, constantly creating new demand for additional housing, highways, sewers, transportation and other public works. As one of the largest U.S. producers of aggregates, concrete, cement and asphalt, CalMat is in a unique position to provide the basic ingredients to support the anticipated growth of these areas. In addition, as reserves are depleted by mining, land located in the same growth markets will become available for development, creating greater value and opportunity for profit in our Properties Division.

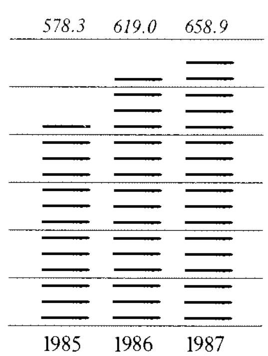
Ideally situated, CalMat will continue to be a vital and necessary part of the Southwest, just as it has been for almost 100 years.

Financial Highlights

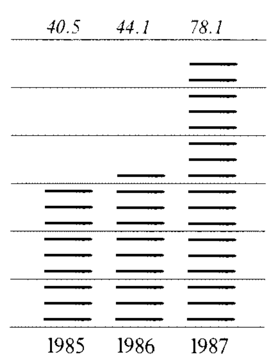
(Amounts in thousands, except per share data)	***1987***	*1986*	*1985*
Total Revenues	**$658,945**	$619,045	$578,341
Earnings*	**78,072**	44,100	40,502
Earnings per Share	**2.53**	1.44	1.34
Dividends	**12,166**	10,278	9,011
Dividends per Share	**.40**	.34	.30

*Includes net gains from sales of investments of $24,922,000 in 1987 and $8,033,000 in 1985.

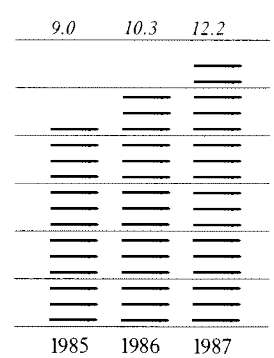
Total Revenues
(In Millions)



Earnings
(In Millions)



Dividends
(In Millions)



During 1987, we enjoyed a continuing high level of construction activity in most of the major areas CalMat serves. Revenues for the year ended December 31, 1987 were $658,945,000 and earnings were $78,072,000 compared to $619,045,000 and $44,100,000 in 1986. Net income for 1987 included a net gain of $24,922,000 from the sale of Valley Reclamation Co.

The Concrete and Aggregates Division set new records in both volume and profitability in 1987 and enters 1988 with greater backlogs than at the start of the previous year. The Division continues to look for acquisition opportunities that will complement our existing operations both geographically and from a management point of view. Acquisition and internal expansion will provide continued growth of this Division.

We were successful in acquiring approximately 2,000 acres of land and obtaining long-term leases on additional land in 1987 which increased our potential reserves of construction aggregates by more than 500 million tons. The majority of these reserves are located within established CalMat markets.

Adding to aggregates reserves becomes more difficult each year due to population encroachment on potential mining acreage and the difficulty of obtaining zoning. These reserves are the foundation of CalMat, impacting virtually all of our Divisions. Following the example of our predecessors, who purchased and held the reserves we are using today, we believe the action we have taken will ensure the profitability of the Company well into the future.

Industrial Asphalt, the largest supplier of asphalt paving materials in the West, is our newest Division. Its 1987 results were excellent and this Division will play an important part in our future plans as we seek to expand our operations into new areas. Despite the increased cost of oil, Industrial Asphalt's profit margins were maintained by stringent control of costs. The Asphalt Division enters 1988 with a healthy backlog and will benefit from the expected increase in highway construction and rehabilitation.

The Cement Division completed another satisfactory year. Despite declining prices brought about by intense competition from foreign imports, volume remained high and acceptable margins were maintained due to several factors. A significant reduction in fuel costs and a $7 million capital expenditure at our Rillito, Arizona plant resulted in substantially reduced power costs and increased production. A similar project is planned for the Mojave, California cement plant. Close scrutiny of operating procedures and expenses, as well as a reduction in personnel contributed to reduced costs.

Cement imports have risen in Southern California to 22% of cement consumed. While the dollar's fluctuation against other Pacific Rim currencies has helped domestic producers, the Mexican cement export industry is benefiting from currency valuations and has been increasingly aggressive. To compete effectively as the cement industry becomes globalized, and in order to have additional flexibility, CalMat entered into a joint-venture to operate an import terminal located at the Los Angeles Harbor. This new entity, now in operation, is known as CalMat Terminals. CalMat has the responsibility for marketing cement from the terminal, and early results are encouraging.

Our Properties Division completed a productive second year of operation. Its three primary areas of activity were our Rio Vista Center in San Diego, our Seventh Street Business Park in Phoenix, Arizona, and the CalMat Business Park in Irwindale, California east of Los Angeles.

In October, we topped out a 200,000 square foot high-rise office building at Rio Vista. This is a joint-venture project and is scheduled for completion in August 1988. Additionally, construction is progressing in Rio Vista on a 350-room Marriott Hotel to serve the Mission Valley area of San Diego. Completion of this joint-venture is scheduled for December 1988.

Two new buildings were completed in Phoenix totaling 115,000 square feet and seven new structures were completed at Irwindale, totaling 132,000 square feet.

While we are creating long-term value for shareholders by such development, we are aware of the need to meet shorter-term shareholder needs. Accordingly, we will continue to sell properties that, in management's opinion, have reached an optimum level of value or do not meet our long-term objectives. The profits from the Division during 1987 reflect management's previous commitment to develop a continuing flow of gains from property activities to supplement profits from our core businesses. CalMat is unique in that aggregate lands purchased today, become development properties for the future.

Since the formation of CalMat in June 1984, we have been implementing a planned program of restructuring through the sale of assets that do not fit our long-term objectives. These sales, including land, have totaled approximately $150 million in three years. The sales and subsequent redeployment of the proceeds, have benefited all shareholders. In September 1987, your Board of Directors authorized management to examine other restructuring alternatives to increase shareholder value. J. P. Morgan and Company was employed to assist management in identifying and exploring these alternatives. The stock market crash of October 1987 caused management to reevaluate this initiative, however, the review is continuing.

In July, Bert A. Getz, President and Director of Globe Corporation, a banking and real estate investment firm in Scottsdale, Arizona, was elected to the Company's Board of Directors. Mr. Getz serves on a number of boards, including Security Pacific National Bank.

We were deeply saddened by the untimely death in November of Mr. Thomas F. Call. Mr. Call had served on CalMat's Board since the merger in 1984 and, prior to that, had served on California Portland Cement Co.'s Board for 22 years. His unstinting loyalty, wise counsel and unfailing support will be sorely missed.

In January, 1988, the Board of Directors elected A. Frederick Gerstell Chief Executive Officer of the Company. He will continue his present responsibilities as President and Chief Operating Officer. William Jenkins will remain as Chairman of the Board and of the Executive and Long Range Planning Committee.

L to R: A. Frederick Gerstell, William Jenkins.

Robert G. Sutherland and Alfred D. Boyer, both of whom are Executive Vice Presidents, North American Operation, of Industrial Equity (Pacific) Limited (IEP), were elected to the Board of Directors on February 23, 1988 to represent IEP's 19.17% interest in CalMat. Their election was the result of a three year standstill agreement reached with IEP settling litigation brought by CalMat. The vacancies were created by the resignation of Ronald Langley, President of IEP, and the death of Mr. Call.

The number of transportation construction projects are expected to accelerate during 1988. Examples include the Century Freeway, Metro Rail, Long Beach Light Rail, and Los Angeles Airport projects, all in Southern California. These projects should offer relief from possible downturns in other business segments.

In view of 1987's strong results and our belief that the Company will equal those results in 1988, the Board of Directors in February voted to increase the dividend rate by 20% to 12¢ per quarter. This follows a similar increase in 1987.

We particularly wish to thank our loyal shareholders, customers and employees for their support during the past year. It is our continuing commitment to serve all of these interests to the best of our ability.

William Jenkins

William Jenkins
Chairman of the Board

A. Frederick Gerstell

A. Frederick Gerstell
President,
Chief Executive Officer and
Chief Operating Officer

CalMat, through Industrial Asphalt, is the largest commercial supplier of hot mix asphalt to the construction industry in the western United States. Its marketing area in California extends from Sacramento to San Diego, and covers all of central and southern Arizona. It will expand in high-growth areas in concert with our aggregates operations.

CalMat, through Industrial Asphalt, is the largest commercial supplier of hot mix asphalt to the construction industry in the western United States. Its marketing area in California extends from north of Sacramento, through the San Francisco Bay Area, San Joaquin Valley and all of Southern California, including San Diego. It also covers all of central and southern Arizona. As the populations of these areas continue to grow, additional highway construction, shopping areas, housing tracts and the rehabilitation of aging road surfaces will be essential.

Hot mix asphalt consists of 94½% aggregates crushed to various sizes and 5½% refined petroleum asphalt. It is generally sold to asphalt paving contractors, state and local governments and general contractors. The mixing process involves the injection of hot liquid asphalt into a heated dryer containing aggregates and sand. Because the finished product hardens on cooling, it must be transported to the job site for immediate use. It is picked up by the customer at company plants. These plants must be strategically located to be profitable and competitive. A full line of specialized paving equipment is rented to contractors on an operated and maintained basis. In addition, a hot oil spreading and paving fabric installation for overlay jobs is provided.

Industrial Asphalt is also the largest manufacturer in the western United States of a mastic-type asphalt seal coat material. "Huntseal®" is a high-quality coating material used for surfacing asphalt paving to prevent water damage and surface erosion. The sealcoat is marketed throughout California, Idaho, Utah, Nevada and Arizona. During 1988 a new "Huntseal®" plant will be built in Dallas, Texas, which will supply the Texas, Oklahoma, Arkansas and Louisiana markets.

The projects Industrial Asphalt supplies vary from parking lots to major freeways. For example, during 1987 we provided paving materials at the Los Angeles Harbor for two container storage lots totaling 137 acres; five miles of freeway paving on Highway 101 in Ventura County, California and numerous shopping center parking areas. One hundred twenty thousand tons of cold mix asphalt was stockpiled throughout Fresno County for County road maintenance use.

Resurfacing aging highways is a major source of business for the Asphalt Division.

A new contract in Arizona required installation of a plant for paving a 30 mile, four-lane divided road cutting across the desert to connect Sun City West, near Phoenix, with a major freeway. This job, which started in November, will not be completed until February or March of 1989. The Concrete and Aggregates Division also has a plant at the same location and will be supplying concrete for curbs, gutters, sidewalks and box culverts.

Current plans include expansion in Southern California and Arizona in concert with planned expansion of our aggregates operations in the same areas.

We have experienced an increase in competition in both California and Arizona during the last year which may have some negative effect on 1988 earnings. We believe, however, Industrial Asphalt is one of the most efficient and well located producers in the market. As a result we expect our current level of profitability to continue.

Asphalt projects vary from major highways to parking lots and driveways. All are essential to an expanding population.

Asphalt Operating Highlights

(amounts in thousands)	***1987***	*1986*	*1985*
Revenues	**$172,531**	$181,422	$156,922
Profits from operations	**41,391**	44,731	22,700

The U.S. cement industry has become globalized as a result of increased foreign ownership of domestic production facilities, joint-ventures with domestic companies and increased cement imports. Management felt it was in the best long-term interest of the Company to participate in this strategic industry change.

Each of the Company's three cement plants significantly lowered costs and improved operating performance during 1987. Fuel and power costs, major operating expenses in the production of cement, were reduced sharply as the benefits of new contracts, negotiated in late 1986, were realized. Manpower levels were also reduced.

CalMat's cement plants are strategically located to serve the high-growth areas of California and Arizona. The Mojave, California plant, located 100 miles north of Los Angeles, serves Los Angeles, Orange, Ventura and Santa Barbara counties and north into the southern section of the San Joaquin Valley. Mojave also serves the Northern California market through a transfer terminal near Stockton.

The Colton plant, in the heart of Southern California's fast growing "Inland Empire," also serves San Diego and Imperial counties as well as Los Angeles and Ventura counties.

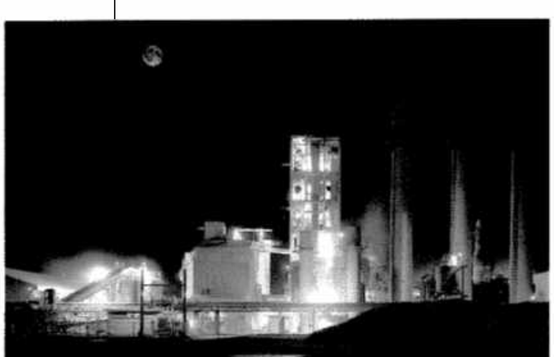
The Rillito plant, 20 miles north of Tucson, Arizona, serves most of the southern region of the state including the metropolitan areas of Phoenix and Tucson.

The largest customer for cement is the ready mixed concrete industry. Cement is also sold to concrete block and pipe manufacturers, as well as to building-materials dealers. Additionally, it is sold directly to contractors for use on such large projects as highways, dams and airport runways.

Because of increased pressure from imported cement, prices

decreased during the year, resulting in lower overall profits. However, the decrease in our manufacturing costs enabled the Division to minimize the effect on profit margins.

The U.S. cement industry has become globalized as a result of increased foreign ownership of domestic production facilities, joint-ventures with domestic companies and increased cement imports, primarily in coastal areas. In parts of the



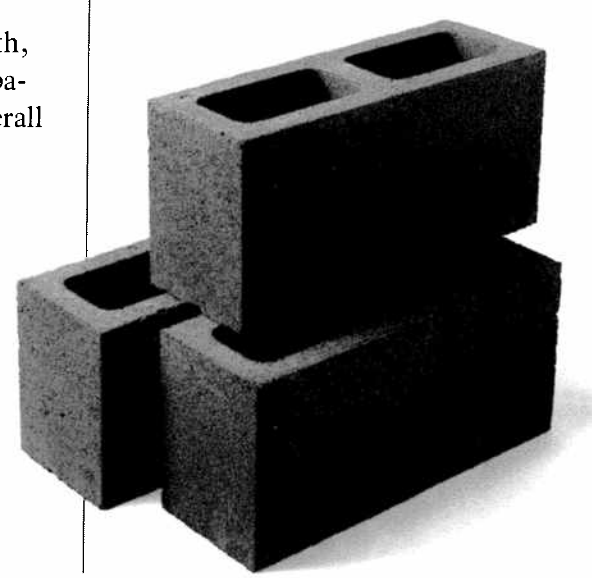
Rillito, Arizona cement plant.

U.S., domestic production facilities have been replaced by import facilities and the domestic industry is now approximately 60% owned by foreign entities.

Significant increases in cement imports are primarily the result of strong U.S. construction markets, excess cement capacity in Pacific Rim countries and Mexico, and low water transportation rates. In Southern California, imports approximated 22% of cement consumed in 1987. In some countries, the government is subsidizing selected production costs, such as power and fuel, for industries like cement that produce products for export.

As a result, management felt that it was in the best long-term interests of the Company to participate in this strategic industry change. During the fourth quarter, the Company entered into a joint-venture to import cement into California. The joint-venture will allow us to enter an important market segment, increase our cement capacity for long-term growth, increase our distribution capabilities, and improve our overall competitiveness.

The versatility of cement is reflected in its use in a diverse number of products. Shopping malls, concrete blocks and dams are just a few of the uses for this indispensable material.



The Company's three cement plants are strategically located to supply the same high-growth areas served by its other operating divisions. Each plant significantly lowered costs and improved operating performance during 1987.

The new terminal is located in the Port of Los Angeles and will operate under the name CalMat Terminals. This state-of-the-art cement import terminal has some 60,000 tons of storage capacity and can accommodate the loading of two trucks simultaneously. It will be supplied by selected Pacific Rim cement manufacturers.

As previously mentioned, fuel is a major element of cost in the manufacture of cement. We are constantly evaluating new and innovative methods to reduce these costs. At the present time projects are underway to evaluate burning liquid organic wastes and selected solid wastes in our cement kiln systems. Due to high temperatures and long retention times, cement kilns have been proven to be an environmentally safe method of disposing of these materials as opposed to depositing them in landfills. The heat recovered from the destruction of these wastes can replace or supplement more expensive fossil fuels, thereby reducing our operating costs. Until testing has been completed, however, we cannot properly evaluate the benefits to the Company.

A seven million dollar, state-of-the-art finish grinding system was completed at the Rillito, Arizona plant. This system consists of a high efficiency classifier coupled with a roll press which effectively reduces the power costs. Total plant finish grinding capacity was increased by 25%. A previous project at Rillito, completed in 1986, increased clinker production by 20%.

During the past seven years the Cement Division has expended in excess of $250 million to modernize plants and improve productivity.

The Company owns substantial limestone reserves at each of its three cement plant locations. The proximity of these reserves to a production plant is essential. Cement is produced by drilling and blasting limestone from quarries. The limestone ore is processed through a series

CalMat Terminals' new facility in the Port of Los Angeles has 60,000 tons of cement storage capacity and can accommodate the loading of two trucks simultaneously.

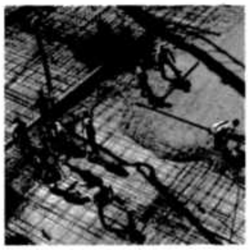
Cement is sold to the ready mixed concrete industry, concrete block and pipe manufacturers and to building materials dealers. It is also sold directly to contractors for use on such large projects as highways and airport runways.

of crushing and grinding procedures into a balanced formula of pulverized fine powder. This fine ground material is carefully homogenized and blended with additive materials and then heated in large rotary kilns at temperatures which reach 2,700° Fahrenheit. The resulting product is a nodule called "clinker" which is cooled and mixed with approximately 5% gypsum and then pulverized once again into a fine powder known as portland cement.

Cement Operating Highlights

(amounts in thousands)	*1987*	*1986*	*1985**
Revenues	**$179,122**	$188,680	$210,554
Profits from operations	**28,366**	31,252	29,813

**includes coal mining operations which were sold in September 1985.*



The majority of the Concrete and Aggregates Division's operations are located in eight of the twenty fastest growing counties in the United States. Its 31 aggregates production plants and 69 ready mixed concrete plants are strategically situated to enhance the Company's competitive position in its markets.

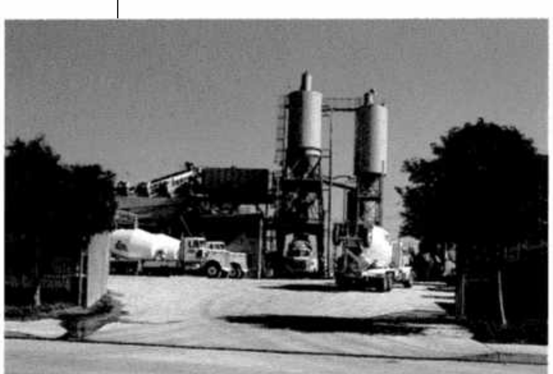
The Concrete and Aggregates Division again set new records in both volume and profitability in 1987. The majority of the Division's operations are located in eight of the 20 fastest growing counties in the United States and even though many of these are highly urbanized areas, the demand for the Division's products continues to increase. Forecasts indicate that these eight counties will have a gain in population of over 3 million by the year 2000.

Sand and gravel is the number one mining industry in the U.S., with a consumption rate of approximately 4 tons per capita per year. In high growth areas, the usage jumps into the range of 10 to 14 tons per capita. Few people think in terms of what the sand and gravel industry is, but from the time they get up in the morning until they go to bed at night, they are surrounded by these products. Whether it is the roof tiles, plaster, or stucco on their houses, concrete or asphalt in their driveways, highways and bridges or the buildings they work in, sand and gravel is the foundation of our modern way of life and culture.

Rock, sand and gravel, known as aggregates, are surface-mined from natural deposits owned or leased adjacent to processing plants. These plants screen, size and wash the material for use in concrete, asphalt and other construction uses. Ready mixed concrete is manufactured by combining aggregates with portland cement, water and chemical admixtures in batch plants. It is then loaded into mixer trucks and mixed in transit to the construction site where it is placed by the contractor. The Company purchases portland cement, a major ingredient in ready mixed concrete, from a number of manufacturers; however, its principal suppliers are the three CalMat cement plants.

Currently 31 aggregate production plants and 69 ready mixed concrete plants are in operation. The Division owns and operates 842 highway trucks used to transport aggregates, ready mixed concrete, and cement.

Because of the high costs associated with the transportation of aggregates and concrete, competition is generally limited to areas of relatively close proximity to production facilities. The ability to deliver quality products in large quantities at competitive costs, and the strategic location of its many plants,



Ready mixed concrete plant, Irvine, California.

enhance the Company's competitive position in the market.

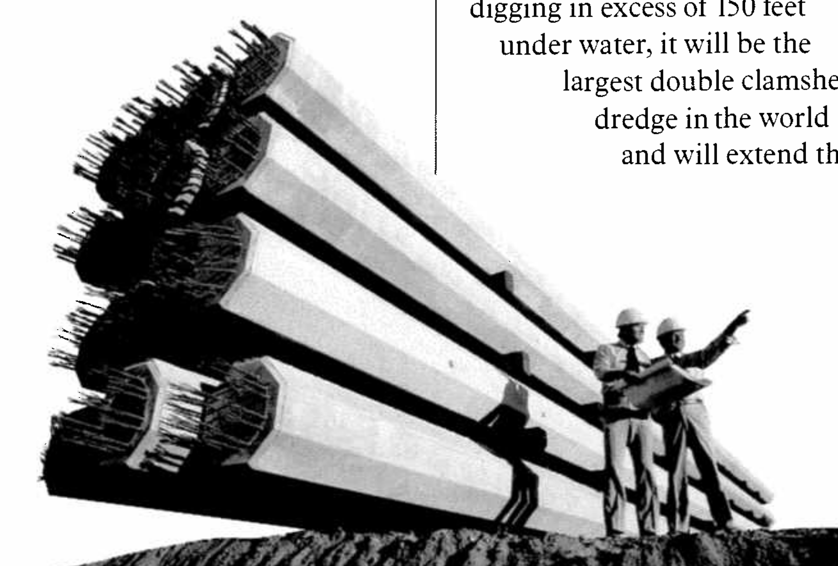
During 1987 the Division expanded the district concept of operation to include Arizona and now has divided the area into four districts, each with its own district manager. This decentralized method of operation has been extremely successful. Local managers are more sensitive to the needs of their own marketing area and their employees, who feel more a part of the decision making process, respond with improved morale and productivity.

Combined, the basic ingredients of cement, sand, gravel and water can produce concrete structures as beautiful as they are useful.

We acquired approximately 2,000 acres of land, and obtained long-term leases on additional land during 1987, which increased our potential aggregates reserves by more than 500 million tons. The majority of these reserves are in established CalMat markets.

The initial phases of the relocation and modernization of the Division's operations in San Diego's Mission Valley were completed during 1987. The move will be made in several phases over a period of three years and will require a total capital expenditure of approximately $12 million. Progress in 1988 will include completion of a new aggregates production plant. All work, including concrete plant, garages and offices will be completed by the end of 1989. This move serves three purposes: 1) It will free valuable land at Mission Valley for development; 2) the new plant will significantly improve operating efficiency, and; 3) aggregate reserves, previously covered by the old plant, will now be excavated.

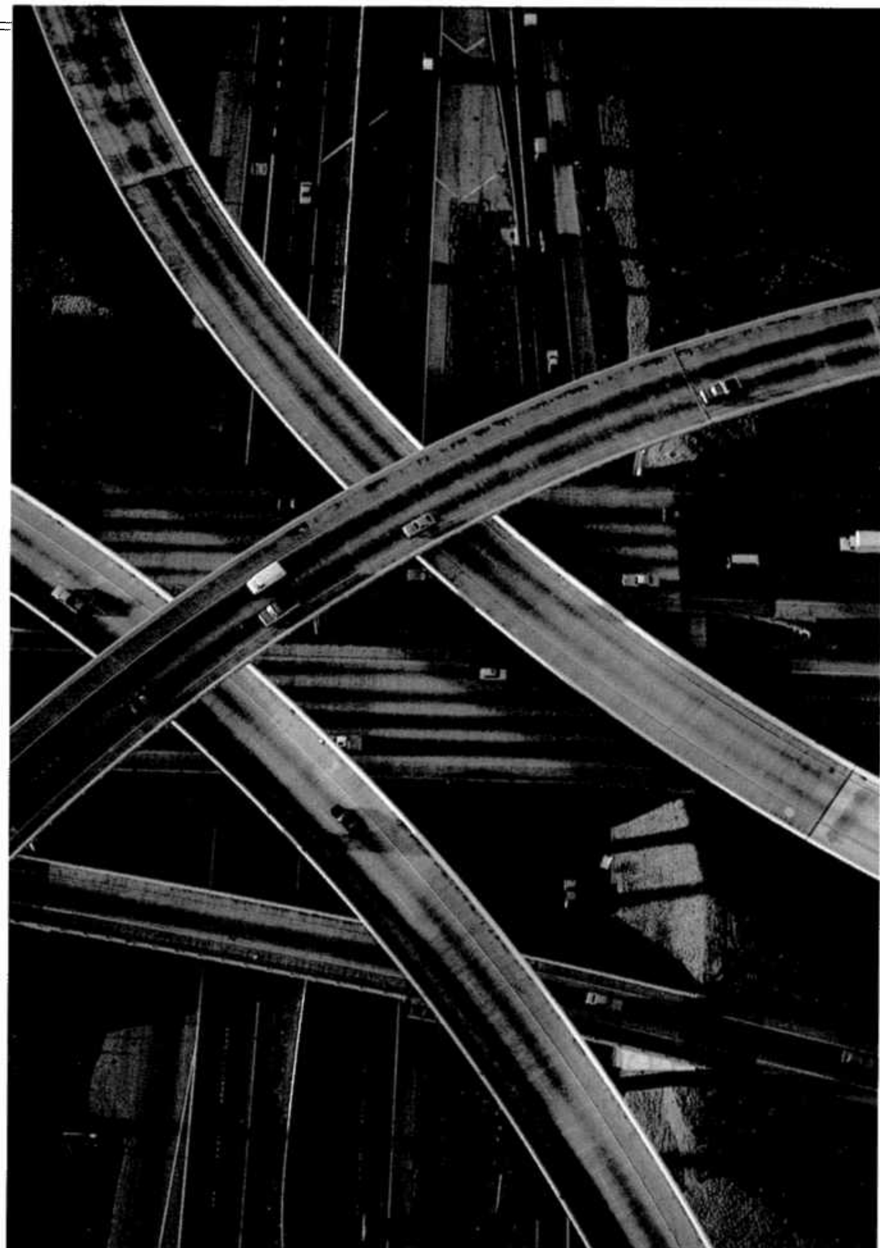
We are currently installing a new double 13-cubic yard clamshell dredge at our Durbin production plant, approximately 20 miles from Central Los Angeles. Fully automated, and capable of digging in excess of 150 feet under water, it will be the largest double clamshell dredge in the world and will extend the life of this vital, centrally located, operation well into the 21st century. The capital expenditure will be in excess of $4 million.



Southern California operations were expanded in August, 1987 by acquiring Moreno Valley Sand and Gravel Co. in Riverside County. This was our first acquisition in the Banning/Hemet area of this fast growing county.

Although the construction markets in Arizona and Central California experienced a decline in 1987, the Division's sales revenues increased due to added operations and increased sales prices in Southern California. While we expect a modest short-term decline in volume for Arizona and Central California, both areas have an anticipated population growth rate in excess of 20% over the next ten years.

At the beginning of 1987 we set a goal of substantially increasing our aggregate reserves. Working with the Properties Division, we acquired approximately 2,000 acres of land, and obtained long-term leases on additional



Concrete paving is a common sight throughout the Southwest where constant highway improvements are vital to continued growth.

land, increasing our potential aggregates reserves by more than 500 million tons. The majority of these reserves are located within established CalMat markets.

Sand and gravel is the foundation of our modern way of life with a per capita consumption rate of approximately 4 tons per year. The usage jumps into the range of 10 to 14 tons in high growth areas.

Concrete & Aggregates Operating Highlights

(amounts in thousands)	***1987***	*1986*	*1985*
Revenues	**$318,398**	$284,976	$219,917
Profits from operations	**56,870**	49,841	34,604

The decision to establish this Division and make a substantial commitment of capital and personnel has proven to be a good one, which is reflected in the growth of developed property revenues. At year-end the Company's developed real estate portfolio contained 2,250,000 square feet, an increase of 26% over 1986.

The Properties Division exceeded its business plan during 1987. Our decision to establish this Division and make a substantial commitment of both capital and personnel has proven to be a good one. This is reflected in the growth of our developed property revenues from 1986. As we construct and lease buildings, we are creating an income stream on land we own.

Our strategy with developable land is to prepare a plan, obtain development rights, subdivide it into marketable parcels, and develop these parcels at a rate commensurate with market conditions.

Real estate ownership and related activities are unlike our other operating divisions. Real estate, especially the development process, often requires significant capital, and can be characterized by uneven earnings and the need for a long-term perspective. While these characteristics will continue, management will strive to balance near-term operating performance and the creation of long-term shareholder value. To accomplish this balance, properties will be sold that, in management's opinion, are fully valued or do not fit our long-term objectives. In addition, we will purchase properties to support our construction material operations and reclaim depleted properties for future development.

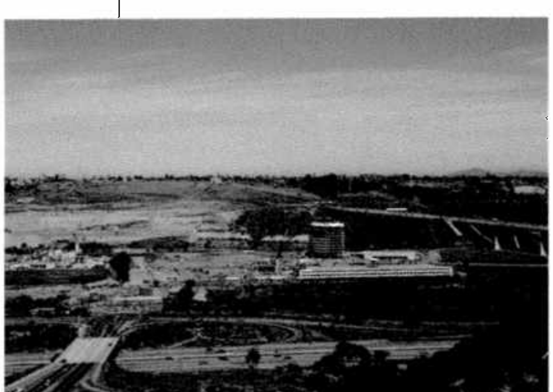
The bulk of the Company's currently developable land and developed properties is held in our unconsolidated real estate subsidiary, CalMat Properties Co. At December 31, 1987 this entity held approximately 1,080 acres of which 123 acres were fully developed with buildings.

At year-end the Company's developed real estate portfolio contained 2,250,000 sq. ft., an increase of 26% over the preceding year. Occupancy, exclusive of buildings under construction, amounted to 88%, approximately the same as last year.

During the year, the Properties Division assisted in an aggressive program of aggregates reserves acquisitions.

Los Angeles Region

Two Los Angeles regions were combined in 1987, resulting in more efficient management of property and development. This is our largest region geographically, and contains the most diverse property opportunities.



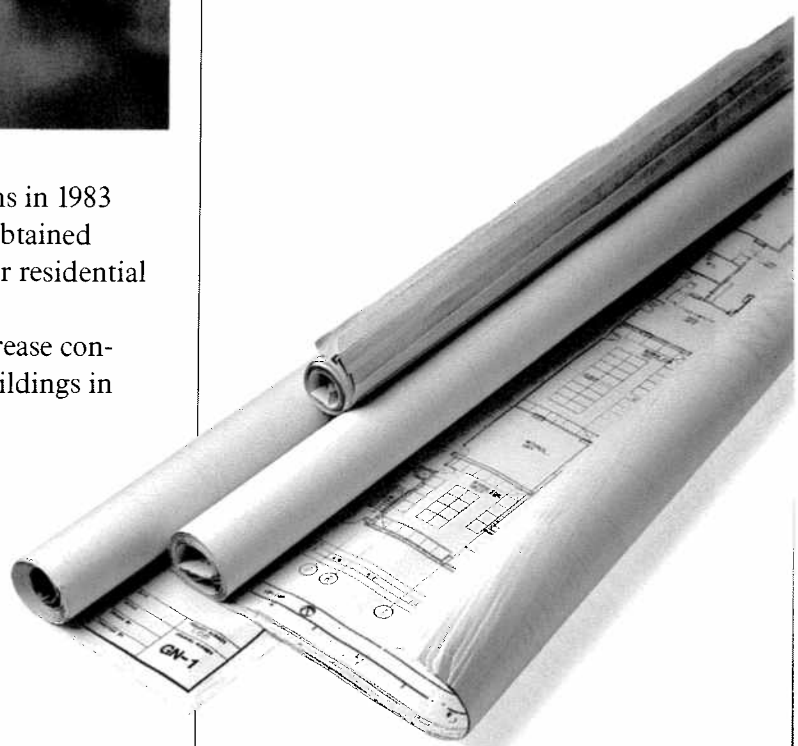
Our Mission Valley property in San Diego County contains the Company's Rio Vista development (right) as well as its Concrete and Aggregates production and mining facilities (left).

Construction of a 200,000 square foot joint-venture office tower in Rio Vista started in March, 1987 and is scheduled for completion in mid-summer, 1988.

During the year, eight buildings containing almost 182,000 sq. ft. were completed in the CalMat Business Center and in the La Cantera Business Park. Future development is planned for property owned in the Sun Valley, Montclair and Colton areas.

In August we completed the sale of a 100-acre parcel of land in the City of Orange for $12 million. This parcel was previously an aggregate mining and production facility. To optimize the value of the property, we ceased operations in 1983 and subsequently obtained necessary zoning for residential development.

We expect to increase construction of new buildings in this region in 1988.



Our strategy with respect to our developable land is to prepare a plan, obtain development rights, subdivide it into marketable parcels, and develop these parcels at a rate commensurate with market conditions.

San Diego Region

Construction of a 200,000 sq. ft. joint-venture office tower in our Rio Vista Center was started in March 1987 and completion is expected in mid-summer 1988. Pre-leasing activity on this project is presently above our projections, and we expect this project to enhance the value of all of our Rio Vista properties. Construction has also started on a joint-venture Marriott Hotel at the same site and completion of this project is expected in December, 1988. We are currently preparing to construct an additional 60,000 sq. ft. garden office building in this business park in 1988.

Phase II of our Rio Vista development plan consists of 86 acres and is approved for 750 hotel rooms, 1,085,000 sq. ft. of office space and 1,400 residential units. Development of the infrastructure will commence in 1989.

Progress is also being made at our Carroll Center project in North San Diego County. A 63,000 sq. ft. multi-tenant project is near completion. Our land holdings in this area total approximately 350 acres.

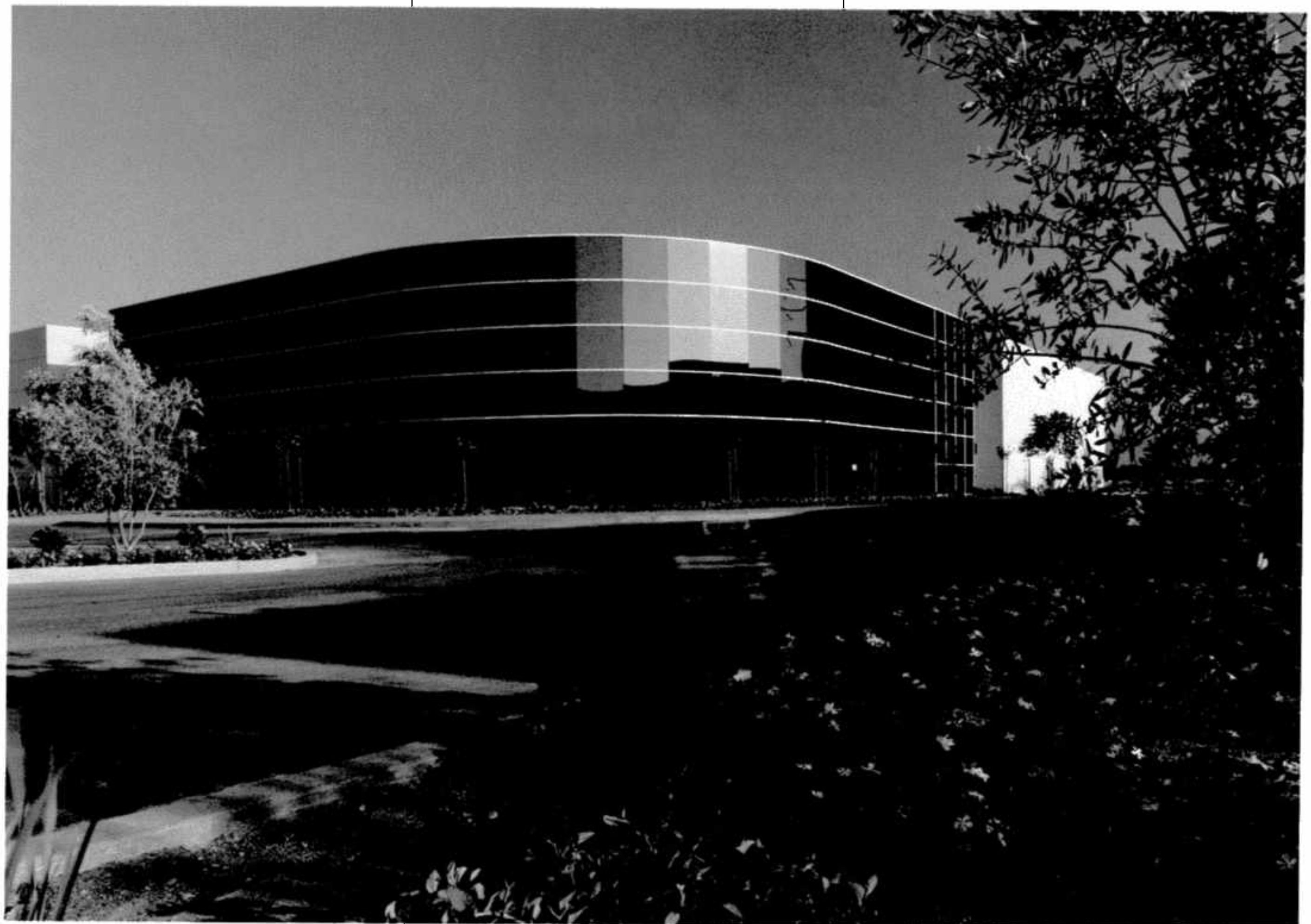
Arizona Region

The first phase of our Phoenix, Arizona 7th Street Business Park contains approximately 54 acres and was completed during the year. A 72,000 sq. ft. distribution building and a 43,000 sq. ft. manufacturing building were part of this phase. Based upon continued strength of the Phoenix lease market, we anticipate the development of approximately 250,000 sq. ft. of additional buildings during 1988.

A conceptual master plan of development for our 1,000-acre Central Phoenix property has been completed. This is a phased plan based on the depletion of mining reserves and the eventual relocation of the processing plant.

Land Leasing and Management

This segment of the Properties Division has the responsibility for property acquisition, operating and construction permits, government zoning, property sales and long-range use plans for all of CalMat's properties.



During 1987 the town of Marana, in the Tucson, Arizona area, granted approval of a specific plan for a 494-acre parcel acquired late in 1986. This approval will eventually allow us to excavate over 30 million tons of aggregates and develop over 4 million square feet of commercial and industrial property adjacent to our existing cement plant.

The Properties Division continued its efforts to generate revenue from our undeveloped property and as a result 1987 rental income increased 22% over the previous year.

The first phase of our Phoenix, Arizona, 7th Street Business Park, containing approximately 54 acres, was completed in 1987. Two structures are currently in the leasing phase and a third is under construction.

Properties Operating Highlights

(amounts in thousands)	***1987***	*1986*	*1985*
Revenues:			
Developed property rentals	**$ 8,572**	$ 4,665	$ 3,413
Undeveloped property rentals	**4,000**	3,288	4,220
Real estate gains	**15,432**	7,762	11,085
Special land uses (landfills, etc.)	**—**	6,064	5,375
Total	**$28,004**	$21,779	$24,093

(amounts in thousands)	***1987***	*1986*	*1985*
Profit (loss) from operations:			
Developed property rentals	**$ 4,356**	$ 1,352	$ (309)
Undeveloped property rentals	**2,992**	2,369	3,433
Real estate gains	**15,432**	7,762	11,085
Special land uses (landfills, etc.)	**—**	3,258	2,421
Total	**$22,780**	$14,741	$16,630

Regulations

The Company is subject to local, state and federal regulation of land use, health and safety, air pollution and other environmental matters. Changes in standards of enforcement of existing regulations or new laws and regulations may require the Company to modify, supplement or replace equipment or facilities or to change or discontinue present methods of operation. These laws and regulations require a substantial commitment of time and resources.

The South Coast Air Quality Management District and the California Air Resources Board have approved nitrogen oxides ("NO_X") emission standards which became effective in July, 1986. These standards, which require reduction in NO_X emission levels at the Colton cement plant, have been achieved. On January 7, 1986, however, the United States Environmental Protection Agency ("EPA") took final action to approve more stringent NO_X emission standards. On March 7, 1986, the Company petitioned the United States Court of Appeals for the Ninth Circuit for a review of the action taken by the EPA. Oral arguments for this petition were heard by the Court of Appeals on January 12, 1988. The Company has not determined the cost of compliance with the standards adopted by the EPA.

The Safe Drinking Water and Toxic Enforcement Act of 1986 (otherwise known as Proposition 65) goes into effect in California during 1988. The Company believes that this Act will not affect its operations or products.

Because of the nature of the Company's business, safety standards and controls are under the jurisdiction of federal and state Occupational Safety and Health Administration and the federal Mine Safety and Health Administration. Considerable time and money are required to train, inspect, report and enforce OSHA and MSHA requirements.

The Company has been generally successful in obtaining zoning approvals from local governing bodies to develop its properties and to mine aggregates, limestone and other raw materials. The State of California and its counties and cities do, however, continue to adopt new laws and regulations relating to land use. These actions may in some instances reduce or restrict some uses of the Company's properties.

Water quality protection permits are required for the Company's public disposal sites, including detailed requirements for the monitoring of these sites during operation and following closure. The Company only accepts inert materials, principally construction and demolition debris at its public disposal sites.

Employees

As of December 31, 1987, the Company had 3,220 full-time employees, of whom 829 were salaried and 2,391 were hourly.

Representation elections for hourly employees of the Company's Cement Division were held in January and March 1987. The Independent Workers of North America union was certified to represent the Company's Rillito, Arizona, and Colton, California, cement plant employees. Employees at our Mojave, California, plant voted to become nonunion and these results have been certified. Negotiations for new labor agreements at both the Colton and Rillito plants have continued for a protracted period, but have not resulted in agreement.

New, three year labor contracts were successfully negotiated in March 1987 with the Teamsters Union for the Concrete and Aggregate Division's hourly employees in Los Angeles, Ventura, San Bernardino and Orange counties. An acceptable settlement, consistent with current labor trends, was executed.

Several labor contracts will expire in 1988 in the Concrete and Aggregates Division and the Asphalt Division. These contracts, covering many of our operations in California and Arizona, are with a variety of labor unions. We anticipate that satisfactory settlements will be reached in all cases.

CalMat Co.

Selected Financial Data

For the years ended December 31

(Amounts in thousands, except per share data)	**1987**	1986	1985	1984	1983
Summary of Operations					
Net sales and operating revenues	**$602,139**	$605,928	$545,422	$331,716	$283,162
Gains on sales of real estate*	**15,432**	7,771	12,249	6,457	6,230
Total revenues	**658,945**	619,045	578,341	339,441	292,637
Income before taxes	**121,117**	74,815	62,792	17,496	10,639
Federal and state income taxes	**43,045**	30,715	22,290	4,001	2,367
Net income**	**78,072**	44,100	40,502	13,495	8,272
Net income per share	**2.53**	1.44	1.34	.45	.30
Weighted average number of shares outstanding during year	**30,864**	30,575	30,270	29,890	28,066
Cash dividends declared	**12,166**	10,278	9,011	8,077	6,915
Dividends per share	**.40**	.34	.30	.27	.25
Balance Sheet Data					
Total assets	**662,788**	646,602	564,616	481,073	467,386
Working capital	**82,662**	78,371	96,267	53,925	61,666
Long-term debt	**54,803**	61,697	54,189	76,676	70,706
Shareholders' equity	**437,582**	370,721	336,104	303,825	296,108
Shareholders' equity per equivalent share at year end	**14.12**	12.13	11.14	10.14	9.92

*Includes gains on sales of real estate by the Company's unconsolidated real estate subsidiary, CalMat Properties Co. See Note 2 of Notes to Consolidated Financial Statements.

**Includes net gains from sales of investments of $24,922,000 in 1987 and $8,033,000 in 1985.

Quarterly Operating Results

(Unaudited; Amounts in thousands, except per share data)

	1987 Quarter Ended				
	March 31	June 30	Sept. 30	Dec. 31	Year
Total revenue	$179,258	$162,899	$168,224	$148,564	$658,945
Gross profit	26,354	35,181	35,094	28,264	124,893
Net income	33,072	14,018	15,514	15,468	78,072
Net income per share	$ 1.07	$ .46	$ .50	$ .50	$ 2.53
Dividends per share	$ .10	$ .10	$ .10	$ .10	$ .40

	1986 Quarter Ended				
	March 31	June 30	Sept. 30	Dec. 31	Year
Total revenue	$120,437	$168,914	$163,979	$165,715	$619,045
Gross profit	16,247	37,050	35,964	42,177	131,438
Net income	3,769	13,293	14,234	12,804	44,100
Net income per share	$ .12	$ .44	$ .46	$ .42	$ 1.44
Dividends per share	$ .085	$ .085	$ .085	$ .085	$ .34

Management's Discussion and Analysis of Financial Condition and Results of Operations

This discussion should be read in conjunction with the Report to Our Shareholders, Business Activities and the Notes to the Consolidated Financial Statements.

Results of Operations — 1985 to 1987

The Company's operations have benefited from the strong economic climate which has prevailed since 1984 and the initiatives that have been successfully implemented by the Company to expand its operations, to rationalize its organization and to improve profitability. Low interest rates coupled with low levels of inflation have resulted in a high level of construction activity in the Company's markets, which CalMat has translated into strong revenues and profits.

Revenues and Profits

Total revenues amounted to $659 million in 1987 compared to $619 million and $578 million in 1986 and 1985, respectively. Sales and operating revenues of the four operating segments, exclusive of intersegment eliminations, are up approximately 3% over 1986 levels versus an increase of 11% in 1986 over 1985. During 1987 and 1985, revenues and income were increased by non-recurring transactions. As part of its strategic initiative, launched in 1984, to focus its resources on its four distinct businesses, CalMat sold in September 1985 all of the operating assets of its Soldier Creek Coal Mine, resulting in a pre-tax gain of approximately $9.4 million. Further disposition of non-core business interests occurred in October 1985 with the sale of CalMat's interest in Statex Petroleum, Inc. for a pre-tax gain of approximately $3 million. Finally, in December 1985 the Company realized a $4.35 million gain on the termination of the former California Portland Cement Company Salaried Employees Pension Plan. Total revenues and pre-tax income in 1987 include a gain from the sale of Valley Reclamation Co. of $41.4 million.

The Asphalt segment saw a slight softening in both prices and volume in 1987 resulting in a 5% reduction in revenues from 1986 and a 7% reduction in profit from operations for the same period. The reduction in revenues and profits has arisen primarily as a result of reduced prices. In 1986 revenues and profits were up by 16% and 97%, respectively, over 1985. The increase in profitability arose primarily as a result of the reduction of the cost of oil.

In the Cement segment, which continued to feel the pressure of foreign competition, 1987 revenues were down 5% due primarily to prices; profits were down 9% from the 1986 levels. In 1986, with prices and tonnage remaining constant with 1985, the Company improved profitability through cost reductions, particularly in the cost of fuels and power. Total revenues in 1986 were down as compared to 1985 primarily because the Company's coal mining operation, whose revenues were included in the segment, was sold in the last half of 1985.

In the Concrete and Aggregates segment, profits from operations continued to grow at a greater level than revenues, with a 14% increase in profits in 1987 over 1986 and a 44% increase in 1986 over 1985. The segment registered a 12% increase in revenues in 1987 over 1986 as a result of volume and price increases of approximately 6% each. The volume increases resulted primarily from acquisitions made at the end of 1986 and during 1987. This segment had a 30% increase in revenue in 1986 over 1985 which was due primarily to volume increases from existing and acquired operations.

On January 1, 1987, all property management activities remaining in the parent company were transferred to the Company's wholly-owned subsidiary, CalMat Properties Co., the primary entity in the Properties Division, which was created in 1985 to develop and manage the Company's real estate portfolio in order to create current cash flow and to build long-term value. Rental revenues from developed properties increased by 84% over 1986. This increase in rent resulted in a three fold increase in profits from operations for the same period. Revenues from developed property in 1986 increased by 37% over 1985. Rental revenues from undeveloped properties in 1987, showed a 22% increase over 1986, while revenues in 1986 were 22% less than 1985 due to reduced royalty revenues on some of the division's leased sand and gravel pits which became depleted. Gains from the sale of real estate in the Properties Division were $15.4 million in 1987 compared to $7.8 million in 1986 and $11.1 million in 1985. In addition, Industrial Asphalt contributed real estate gains of $1.1 million in 1985.

Costs and Expenses

Cost of goods sold as a percentage of net sales has increased slightly from 78% in 1986 to 79% in 1987. The increase in the percentage is more reflective of a decrease in the selling prices of cement and asphalt than an actual increase in costs. Cost of goods sold represented 83% of net sales in 1985. The increase in gross profit percentage in 1986 over 1985 is the result of the relationship of increased volumes to fixed costs.

Selling, general and administrative expenses increased in 1987 over 1986 primarily due to business acquisitions which were made in December 1986. Interest expense was higher in 1987 than 1986 because average outstanding debt was higher in 1987. Interest rates remained fairly constant over the same periods. Interest expense was lower in 1986 than 1985 because of lower interest rates and debt reduction during the second half of 1985. Other expenses were $1.8 million, $2.6 million and $3.2 million in 1987, 1986 and 1985, respectively. The continued reduction of other expenses reflects actions the Company has taken to streamline its operations and dispose of various investments and affiliates.

Provision for federal and state income taxes is lower than normal corporate statutory rates due primarily to the effects of percentage depletion permitted for tax purposes in connection with mining aggregates and limestone, capital gains tax rates, and in 1985, investment tax credits. The Company's effective tax rates for 1987, 1986 and 1985 were 39.3%, 41.7% and 36.0%, respectively. Net earnings for the year ended December 31, 1986 were negatively impacted by the elimination of the Investment Tax Credit which contributed significantly to the increase in the effective tax rate in 1986 over 1985. In 1987 the capital gains rate was increased from 28% in 1986 to 34% and the corporate rate was reduced from 46% in 1986 to 40%.

From 1985 through 1987 the net effect of inflation on costs and expenses was not significant.

Liquidity and Capital Resources

Cash and short-term investments were $4.9 million at December 31, 1987 compared with $10.5 million at December 31, 1986. Total long-term and short-term borrowings at the same dates were $58.8 million and $66.1 million, respectively. At December 31, 1987 and 1986 the Company had working capital of approximately $82.7 million and $78.4 million, respectively, with current ratios of 2.2 to 1 and 1.9 to 1, respectively.

CalMat has relied primarily on the results of its operations to generate the cash necessary to meet its needs for 1987. Funds generated from operations in 1987 were $64.4 million versus $89.5 million in 1986 and $66.3 million in 1985. In 1986 and 1985 an additional $33.4 million and $117.4 million, respectively, were raised from the disposition of certain investments and property and equipment. Funds used to purchase property, plant and equipment and general business expansion amounted to $75.6 million in 1987, $138.9 million in 1986 and $81.1 million in 1985. While the level of business expansion was lower in 1987 than in the prior two years, it continues to be management's intention to expand operations with cash generated from operations or borrowings.

In the Company's unconsolidated real estate subsidiary, CalMat Properties Co., total debt has risen by $27.8 million for the year to $40.7 million at December 31, 1987, with the majority of the increase being permanent financing on existing properties. Property and improvements have increased during the same period by $30.7 million.

Future Accounting Requirements

The Financial Accounting Standards Board issued Statement No. 96 during 1987, specifying new standards of accounting for income taxes. The Statement, which is to be implemented by 1989, requires that deferred taxes be calculated on the differences between the tax basis of assets and liabilities and their amounts for financial reporting purposes using the tax rate currently in effect. Presently, deferred taxes are based on the difference between income reported for tax purposes and income reported for book purposes and the deferred tax balance is not adjusted for changes in the tax rate. Based on the 1988 Federal Tax rate of 34%, the Company's deferred tax balance would be reduced by applying this new method. This reduction would be reflected as a reduction of income tax expense at the time the Company adopts the statement, but no later than 1989.

The Financial Accounting Standards Board also recently issued Statement No. 94—Consolidation of All Majority-owned Subsidiaries and Statement No. 95—Statement of Cash Flows. These Statements have no financial impact on the Company's net income and disclosures required by them will be made in 1988.

CalMat Co.

Consolidated Balance Sheets

December 31

(Amounts in thousands)	1987	1986
Assets		
Current Assets:		
Cash	**$ 444**	$ 3,729
Short-term investments, at cost (which approximates market), primarily commercial paper, U.S. government obligations and certificates of deposit	**4,428**	6,792
Trade accounts and notes receivable, less allowance for discounts and doubtful accounts ($3,390 in 1987 and $4,150 in 1986)	**77,862**	98,119
Inventories:		
Finished products	**6,075**	5,959
Products in process	**14,908**	8,764
Materials and supplies	**25,895**	29,936
Prepaid expenses and other	**12,458**	7,512
Installment notes receivable — current portion	**7,432**	7,839
Total current assets	**149,502**	168,650
Installment notes receivable and other assets	**14,931**	15,983
Investments in and advances to unconsolidated real estate subsidiary	**59,600**	55,079
Costs in excess of net assets of subsidiaries	**34,779**	30,235
Property, plant and equipment, at cost:		
Land and mineral deposits	**81,408**	74,196
Plant structures, machinery and equipment	**514,763**	490,207
Transportation equipment	**53,999**	44,619
Construction in progress	**24,930**	9,854
Total	**675,100**	618,876
Less accumulated depreciation and depletion	**(271,124)**	(242,221)
Property, plant and equipment, net	**403,976**	376,655
Total assets	**$662,788**	$646,602
Liabilities and Shareholders' Equity		
Current Liabilities:		
Accounts payable	**$ 31,250**	$ 41,568
Accrued liabilities	**27,962**	29,673
Notes and bonds payable — current portion	**3,999**	4,438
Federal and state income taxes	**578**	12,025
Dividends payable	**3,051**	2,575
Total current liabilities	**66,840**	90,279
Deferred gains, net of applicable federal and state income taxes	**4,438**	30,188
Notes and bonds payable — long-term portion	**54,803**	61,697
Huntmix purchase commitment	**8,000**	
Deferred income taxes	**91,125**	93,717
Total liabilities	**225,206**	275,881
Shareholders' Equity:		
Preferred stock, par value $1; authorized 5,000,000 shares; none issued or outstanding		
Common stock, par value $1; authorized 100,000,000 shares; issued 35,551,840 shares — 1987 and 35,298,446 shares — 1986	**35,552**	35,298
Additional paid-in capital	**38,265**	36,112
Retained earnings	**367,315**	301,409
	441,132	372,819
Less: Treasury stock (5,046,737 shares — 1987 and 4,999,504 shares — 1986), at cost	**(3,550)**	(2,098)
Total shareholders' equity	**437,582**	370,721
Total liabilities and shareholders' equity	**$662,788**	$646,602

The accompanying notes are an integral part of these statements.

CalMat Co.

Consolidated Statements of Operations

For the years ended December 31

(Amounts in thousands, except per share data)	**1987**	1986	1985
Revenues:			
Net sales and operating revenues	**$602,139**	$605,928	$545,422
Gains on sales of investments, affiliates and operating assets	**41,371**		12,453
Equity in earnings of unconsolidated real estate subsidiary	**11,657**	1,168	918
Gains on sales of real estate		6,632	10,518
Other income	**3,778**	5,317	9,030
	658,945	619,045	578,341
Costs and expenses:			
Cost of products sold and operating expenses	**477,246**	474,490	454,195
Selling, general and administrative expenses	**54,708**	47,408	43,522
Interest expense	**4,122**	3,492	7,151
Other expense	**1,752**	2,585	3,151
Minority interest		16,255	7,530
	537,828	544,230	515,549
Income before income taxes	**121,117**	74,815	62,792
Federal and state income taxes	**43,045**	30,715	22,290
Net income	**$ 78,072**	$ 44,100	$ 40,502
Net income per share	**$ 2.53**	$ 1.44	$ 1.34
Cash dividends per share	**$ .40**	$ .34	$ .30

The accompanying notes are an integral part of these statements.

CalMat Co.

Consolidated Statements of Shareholders' Equity

For the years ended December 31, 1987, 1986 and 1985

(Amounts in thousands)	Common Stock	Additional Paid-In Capital	Retained Earnings	Treasury Stock	Total Shareholders' Equity
Balance, December 31, 1984	$17,456	$51,550	$236,096	$(1,277)	$303,825
Net income for 1985			40,502		40,502
Stock options exercised and shares repurchased	107	905		(224)	788
Cash dividends declared			(9,011)		(9,011)
Balance, December 31, 1985	17,563	52,455	267,587	(1,501)	336,104
Net income for 1986			44,100		44,100
Stock options exercised and shares repurchased	86	1,306		(597)	795
Cash dividends declared			(10,278)		(10,278)
Two-for-one stock split	17,649	(17,649)			
Balance, December 31, 1986	35,298	36,112	301,409	(2,098)	370,721
Net income for 1987			78,072		78,072
Stock options exercised and shares repurchased	254	2,153		(1,452)	955
Cash dividends declared			(12,166)		(12,166)
Balance, December 31, 1987	$35,552	$38,265	$367,315	$(3,550)	$437,582

The accompanying notes are an integral part of these statements.

CalMat Co.

Consolidated Statements of Changes in Financial Position

For the years ended December 31

(Amounts in thousands)	1987	1986	1985
Funds were provided from:			
Net income	**$ 78,072**	$ 44,100	$ 40,502
Non-cash charges (credits) to income:			
Depreciation, cost depletion and amortization	**35,352**	32,237	29,328
Deferred income taxes — non-current	**(2,592)**	15,319	19,828
Minority interest		16,255	7,530
Net income of unconsolidated real estate subsidiary	**(11,657)**	(1,168)	(918)
Notes receivable arising from sales of real estate			(11,439)
Other	**908**	1,163	(1,194)
Gains on sale of investments, property and equipment	**(25,750)**		(16,778)
Changes in working capital accounts:			
Trade accounts and notes receivable	**20,257**	(25,859)	(21,191)
Refundable federal income taxes			787
Inventories, installment notes receivable, prepaid expenses and other	**(6,758)**	(958)	9,157
Accounts payable, accrued liabilities and notes, bonds, and dividends payable	**(11,992)**	(1,719)	8,298
Federal and state income taxes currently payable	**(11,447)**	10,123	2,402
Total funds from operations	**64,393**	89,493	66,312
Proceeds from issuance of notes and bonds payable	**8,000**	7,500	8,000
Less restricted unexpended proceeds			(8,000)
Exercise of stock options	**955**	795	788
Disposition of investments and property and equipment	**2,108**	33,400	117,403
Receipts on long-term notes receivable	**13,842**	6,197	3,165
Total funds provided	**89,298**	137,385	187,668
Funds were required for:			
Purchase of property, plant and equipment	**59,728**	58,937	58,175
Investment in and advances to affiliates and subsidiaries, net	**6,159**	79,978	22,893
Cash dividends declared	**12,166**	10,278	9,011
Increase in installment notes receivable	**10,000**		
Distribution to minority interest		6,506	2,851
Reduction of notes and bonds payable	**6,894**	17,000	62,200
Total funds required	**94,947**	172,699	155,130
Increase (Decrease) in cash and short-term investments	**(5,649)**	(35,314)	32,538
Balance, beginning of year	**10,521**	45,835	13,297
Balance, end of year	**$ 4,872**	$ 10,521	$ 45,835

The accompanying notes are an integral part of these statements.

CalMat Co.

Notes to Consolidated Financial Statements

1. Summary of Significant Accounting Policies:

Principles of Consolidation:

The consolidated financial statements include the accounts of CalMat Co. (the Company) and all of its subsidiaries except CalMat Properties Co., a wholly-owned real estate subsidiary, which is accounted for by the equity method. Minority interest in 1986 and 1985 results primarily from the 50% interest in Industrial Asphalt, a Joint Venture, which became wholly-owned on December 31, 1986.

Costs in Excess of Net Assets of Subsidiaries:

Costs in excess of the fair value of net assets of purchased subsidiaries are amortized on a straight-line basis over periods not exceeding 40 years.

Inventories:

Cement and related product inventories are carried at the lower of moving average cost or market. The cost of extracting aggregates is expensed in the period incurred and the related stockpiles are not inventoried.

Property, Plant and Equipment:

Property, plant and equipment is carried at cost. Depreciation is computed using primarily straight-line rates over the following estimated useful lives:

	Life in Years
Plant structures	5–50
Machinery and equipment	4–25
Transportation equipment	4–10

Depletion of rock and sand deposits is computed by the unit of production method based upon estimated recoverable quantities of rock and sand.

Significant expenditures which extend the useful lives of existing assets are capitalized. All other maintenance and repair costs are charged to current operations. Interest cost capitalized on long-term capital projects amounted to $562,000, $775,000 and $1,933,000 for the years ended December 31, 1987, 1986 and 1985, respectively.

The cost and related accumulated depreciation of assets replaced, retired or otherwise disposed of are eliminated from the property accounts and any gain or loss is reflected in income.

Income Taxes:

Income taxes are provided based on earnings reported for financial statement purposes. The provision for income taxes differs from amounts currently payable because of timing differences in the recognition of certain income and expense items for financial reporting and tax purposes. These timing differences result principally from accelerated tax depreciation, condemnation gains, real estate exchanges, and state franchise taxes.

Deferred Gains:

Deferred gains represent the unrecognized income resulting from the sale of land recorded on the installment method and gains resulting from a sale and leaseback transaction (Note 10), all net of applicable state and federal taxes.

Future Accounting Requirements:

The Financial Accounting Standards Board issued Statement No. 96 during 1987, specifying new standards of accounting for income taxes. The Statement, which is to be implemented by 1989, requires that deferred taxes be calculated on the differences between the tax basis of assets and liabilities and their amounts for financial reporting purposes using the tax rate currently in effect. Presently, deferred taxes are based on the difference between income reported for tax purposes and income reported for book purposes and the deferred tax balance is not adjusted for changes in the tax rate.

The Financial Accounting Standards Board also recently issued Statement No. 94—Consolidation of All Majority-owned Subsidiaries and Statement No. 95—Statement of Cash Flows. These Statements have no financial impact to the Company and disclosures required by them will be made in 1988.

Reclassification:

Certain reclassifications have been made to the 1986 Consolidated Financial Statement to conform to the 1987 presentation.

2. Investments in and Advances to Unconsolidated Real Estate Subsidiary

Condensed financial information of the Company's unconsolidated, wholly-owned real estate subsidiary, CalMat Properties Co. follows:

(Amounts in thousands)	1987	December 31, 1986	1985
Financial Position			
Property and improvements	**$ 99,738**	$69,094	$35,580
Other assets	**20,636**	3,797	4,818
Total assets	**120,374**	72,891	40,398
Bonds and trust deed notes payable	**34,358**	12,876	9,986
Construction loans	**6,357**	—	6,000
Other liabilities	**20,059**	4,936	3,787
Total liabilities	**60,774**	17,812	19,773
Shareholder's investment	**$ 59,600**	$55,079	$20,625
Results of Operations			
Rental income	**$ 12,572**	$ 5,087	$ 3,754
Gains on sales of real estate	**15,432**	1,139	1,731
	28,004	6,226	5,485
Costs and expenses	**8,674**	4,428	4,088
Income before income taxes	**19,330**	1,798	1,397
Income taxes	**7,673**	630	479
Net Income	**$ 11,657**	$ 1,168	$ 918

Municipal improvement bonds are payable in semiannual installments plus interest from 5.5% to 7.75% per annum. Trust deed notes are payable in monthly installments to 2011, including interest at 9¼% to 13¼% per annum, certain of which are guaranteed by the Company. Annual maturities for the next five years range from $367,000 to $3,638,000. The construction loans are expected to be converted to long term loans on completion of the projects. Interest expense was $3,963,000 in 1987, $1,233,000 in 1986 and $2,016,000 in 1985, of which construction period interest of $2,033,000 in 1987, $904,000 in 1986 and $399,000 in 1985, was capitalized as part of the cost of property and improvements.

3. Accrued Liabilities:

Accrued liabilities consist of the following at December 31:

(Amounts in thousands)	1987	1986
Payrolls, vacation and other benefits	**$14,253**	$14,668
Property taxes	**3,740**	3,335
Interest payable	**984**	945
Other	**8,985**	10,725
	$27,962	$29,673

4. Notes and Bonds Payable:

Notes and bonds payable at December 31, consist of the following:

(Amounts in thousands)	1987	1986
Notes payable to banks	**$19,500**	$24,310
9.95% Promissory Note	**15,000**	18,000
Pollution Control and Industrial Development Revenue Bonds	**18,800**	18,800
Other notes payable	**5,502**	5,025
Total	**58,802**	66,135
Less current portion	**3,999**	4,438
Long-term portion	**$54,803**	$61,697

Maturities of notes and bonds payable during the next five years are as follows: 1988, $3,999,000; 1989, $6,980,000; 1990, $15,913,000; 1991, $8,331,000; 1992, $3,658,000.

Notes payable to banks include various loans under revolving credit agreements which expire in 1989 and beyond. Borrowings under the credit agreements bear interest at rates equal to or less than the prime bank lending rate (8¾% at December 31, 1987).

The 9.95% Promissory Note is due February 15, 1992 and requires annual sinking fund payments of $3,000,000 until the note is repaid. The tax exempt Pollution Control and Industrial Development Revenue Bonds consist of 7% bonds totaling $10,800,000 and requiring annual sinking fund payments in years 2000 through 2008 ranging from $200,000 to $1,700,000 with a final payment of $6,500,000 due in 2009 and a 8.99% bond of $8,000,000 containing no sinking fund provision which is due in 2005. The bonds are collateralized by certain pollution control facilities with a net book value of approximately $10,000,000.

At December 31, 1987 the Company had various unused lines of credit totaling approximately $13,500,000 which carry commitment fees of approximately ¼% per annum.

The notes and bonds contain certain restrictions with respect to the incurrence of additional debt, creation of liens and guarantees, and maintenance of minimum working capital and shareholders' equity. The Company has complied with all of these restrictions.

5. Federal and State Taxes:

The composition of the tax provision is as follows:

(Amounts in thousands)	**1987**	1986	1985
Federal Income Tax:			
Currently payable	**$35,654**	$10,321	$ 1,724
Deferred	**(1,787)**	13,681	15,013
	33,867	24,002	16,737
State Franchise Tax:			
Currently payable	**8,693**	4,104	4,637
Deferred	**485**	2,609	916
	9,178	6,713	5,553
	$43,045	$30,715	$22,290

Deferred tax expense results from timing differences in the recognition of revenue and expense for tax and financial statement purposes. The sources of deferred taxes are as follows:

Accelerated tax depreciation	**$ (130)**	$ 8,638	$ 9,397
State franchise tax	**(1,281)**	1,057	(2,347)
Real estate exchanges		2,668	2,395
Condemnation gains			179
Deferred gross profit on receivables	**(961)**	826	3,282
Capitalized interest	**(300)**	(1,564)	679
Sale of cogeneration facility	**236**	1,333	(3,103)
Other	**(256)**	938	(98)
Tax operating loss and tax credits carried forward	**1,390**	2,394	5,545
	$(1,302)	$16,290	$15,929

A reconciliation of the provision for income taxes to the federal statutory income tax rate is as follows:

Income tax expense at statutory rates	**$48,446**	$34,415	$28,884
Less effect of:			
Federal tax benefit of state franchise tax	**4,312**	3,757	2,555
Investment tax credits		1,250	3,337
Percentage depletion in excess of cost depletion	**3,240**	4,200	2,415
Capital gain benefit	**3,522**	1,194	3,957
Equity in earnings of unconsolidated subsidiary	**4,662**	537	422
Other	**(1,157)**	(525)	(539)
Reported federal income tax expense	**33,867**	24,002	16,737
Add: state franchise tax	**9,178**	6,713	5,553
	$43,045	$30,715	$22,290

6. Stock Options and Rights:

The Company has stock option plans that provide for granting incentive and non-qualified options on common stock to officers and key employees. Certain information relative to stock options follows:

	SHARES		
	1987	1986	1985
Outstanding at beginning of year	**1,238,308**	854,078	849,708
Granted	**327,500**	572,000	218,400
Exercised	**(247,128)**	(173,392)	(204,778)
Expired			
Canceled or terminated	**(8,000)**	(14,378)	(9,252)
Outstanding at end of year	**1,310,680**	1,238,308	854,078
Available for future options	**672,500**	28,604	590,852
Exercisable at end of year	**604,958**	647,544	422,850

Prices per share of common stock under option range from $3.15 to $30.00 at December 31, 1987. Options expire from 1991 to 1997. Prices per share of options exercised during the year range from $3.15 to $14.625 in 1987, $3.15 to $12.75 in 1986 and $3.15 to $11.375 in 1985. Stock options may be issued to executives and certain key employees as determined by the Compensation and Stock Option Committee of the Board of Directors. The price of the shares subject to each option shall be set by the Committee, but shall not be less than the fair market value of the shares at the date of grant. Options generally become exercisable in installments beginning one year after the date of grant and expire 10 years after grant. During 1986 non-qualified options were granted for 290,470 shares which were exercisable immediately.

In September 1987, the Company declared a dividend distribution of one common share purchase right on each outstanding share of common stock. When exercisable, each right will entitle its holder to buy one share of the Company's common stock at a price of $90.00 per share until September 1997. The rights will become exercisable if a person acquires 25 percent or more of the Company's common stock or makes an offer, the consummation of which will result in the person's owning 30 percent or more of the Company's stock. In the event the Company is acquired in a merger, each right entitles the holder to purchase common stock of the surviving company having a market value twice the exercise price of the right. The rights may be redeemed by the Company at a price of five cents per right at any time prior to a person's acquiring 25 percent of the Company's common stock.

7. Earnings Per Share:

Earnings per common equivalent share (common shares adjusted for dilutive effect of common stock options) have been computed by dividing net income for each period by the weighted average equivalent shares of Common Stock outstanding.

Weighted average shares used for 1987, 1986 and 1985 totaled 30,864,462, 30,574,866 and 30,269,608, respectively.

8. Thrift and Profit-Sharing Retirement and Pension Plan:

The Company has a trusteed employees' thrift and profit-sharing and a money purchase pension plan to provide funds from which retirement benefits may be paid to substantially all salaried employees of the Company and its wholly-owned subsidiaries, including officers and directors who are also employees. Annual contributions to these plans are made from profits of the Company equal to 15% of the aggregate compensation paid or accrued each year to participants in the plan, not to exceed the Company's current earnings before income taxes. The Company also contributes to various union pension plans, as specified by certain union agreements, which cover substantially all union employees. Contributions to all employee plans charged to income totaled $12,456,000 in 1987, $10,690,000 in 1986 and $9,334,000 in 1985.

The Company also has a trusteed defined benefit pension plan covering virtually all hourly employees within the Company's cement segment. As of the 1987 and 1986 valuation dates, the actuarially computed present value (as estimated by consulting actuaries) of vested and non-vested benefits was approximately $15,000,000, using a discount rate of 8% for 1987 and 1986. Net plan assets, which totaled approximately $27,000,000 as of December 31, 1987 and 1986, are invested in a diversified portfolio that consists primarily of corporate equity and government securities.

9. Business Segment Information:

The Company operates principally in four business segments: Asphalt, Cement, Concrete & Aggregates and Properties. Operations in the Asphalt segment involve the manufacture and sale of asphaltic concrete. Operations in the Cement segment involve the manufacture and sale of portland cement. Operations in the Concrete & Aggregates segment include the mining and sale of aggregates and the manufacture and sale of ready mixed concrete. The Properties segment, including the operations of CalMat Properties Co., a wholly-owned unconsolidated real estate subsidiary (Note 2), includes the development, leasing and management of various types of industrial and office buildings, the leasing of undeveloped real property and the sale of real property.

Business segment information for the years ended December 31, is as follows:

(Amounts in thousands)	**1987**	1986	1985
Revenues:			
Asphalt	**$172,531**	$181,422	$156,922
Cement	**179,122**	188,680	210,554
Concrete & Aggregates	**318,398**	284,976	219,917
Properties	**28,004**	21,779	24,093
Corporate and other	**45,149**	6,156	20,136
Intersegment eliminations	**(67,912)**	(58,910)	(48,714)
	675,292	624,103	582,908
Unconsolidated subsidiary	**(16,347)**	(5,058)	(4,567)
Total	**$658,945**	$619,045	$578,341
Profit from operations:			
Asphalt	**$ 41,391**	$ 44,731	$ 22,700
Cement	**28,366**	31,252	29,813
Concrete & Aggregates	**56,870**	49,841	34,604
Properties	**22,780**	14,741	16,630
Corporate and other	**41,663**	2,008	17,727
	191,070	142,573	121,474
Unconsolidated subsidiary	**(11,123)**	(603)	(479)
Minority interests	**—**	(16,255)	(7,530)
Total	**$179,947**	$125,715	$113,465
Identifiable assets (as of December 31):			
Asphalt	**$104,854**	$109,080	$ 56,603
Cement	**271,796**	267,718	255,889
Concrete & Aggregates	**211,216**	180,210	131,427
Properties	**120,374**	85,605	73,940
Corporate and other	**15,212**	21,801	66,530
	723,452	664,414	584,389
Unconsolidated subsidiary	**(60,664)**	(17,812)	(19,773)
Total	**$662,788**	$646,602	$564,616

9. Business Segment Information (continued):	*1987*	*1986*	*1985*
Depreciation and depletion:			
Asphalt	**$ 5,191**	$ 4,966	$ 4,440
Cement	**16,035**	14,287	15,212
Concrete & Aggregates	**13,246**	11,894	8,463
Properties	**2,257**	2,329	1,865
Corporate and other	**175**	96	180
	36,904	33,572	30,160
Unconsolidated subsidiary	**(2,257)**	(1,335)	(832)
Total	**$ 34,647**	$ 32,237	$ 29,328
Capital expenditures and business expansion:			
Asphalt	**$ 12,890**	$ 52,890	$ 9,500
Cement	**21,017**	32,215	32,945
Concrete & Aggregates	**34,411**	47,251	34,352
Properties	**35,429**	22,373	8,839
Corporate and other	**7,279**	1,308	—
	111,026	156,037	85,636
Unconsolidated subsidiary	**(35,429)**	(17,122)	(4,568)
Total	**$ 75,597**	$138,915	$ 81,068

Total revenues by segment include both sales to unaffiliated customers, as reported in the Company's consolidated statements of operations, and intersegment sales. Profit from operations by segment represents total revenues less direct operating expenses. In computing profit from operations, none of the following items have been deducted: corporate and divisional selling, general and administrative expenses, interest expense and federal and state income taxes. Corporate and other, in revenues and profit from operations, includes gain from the sale of Valley Reclamation Company in 1987, and in 1985 gains on sales of Soldier Creek Coal Mine assets, the investment in Statex Petroleum, Inc. and gain on termination of pension plan. Assets classified as corporate and other consist primarily of cash, short-term investments and other assets.

10. Commitments and Contingencies:

In June 1985, the Company entered into a sale and lease-back of a cogeneration facility at its Colton cement plant under a 15-year operating lease with options to renew for up to five additional years. The renewal option provides for rents to be determined based on the estimated market value of the facility at that time. The lease requires payment of property taxes, insurance and maintenance costs in addition to rental payments. Substantially all of the gain on this sale was deferred and is being amortized to income on a straight-line basis over the 15 year lease term. The Company is committed to pay $5,335,000 per annum under this lease which expires in the year 2000.

Under the terms of the purchase agreement of Huntmix Inc., a wholly owned subsidiary which has a 50% interest in Industrial Asphalt, the Company is committed to pay an additional amount to be determined in 1992 based on a formula related to the earnings of Industrial Asphalt. At December 31, 1987 $8,000,000 has been accrued as an estimate of the minimum the Company will be required to pay under the agreement.

11. Subsequent Event:

The purchase commitment for Huntmix, Inc. (Note 10) was settled on February 29, 1988 for $22,500,000 which will be paid out of long-term borrowings.

Report of Certified Public Accountants

To the Shareholders and Board of Directors
CalMat Co.
Los Angeles, California

We have examined the consolidated balance sheets of CalMat Co. and subsidiaries as of December 31, 1987 and 1986, and the related consolidated statements of operations, shareholders' equity and changes in financial position for each of the three years in the period ended December 31, 1987. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the consolidated financial statements referred to above present fairly the consolidated financial position of CalMat Co. and subsidiaries at December 31, 1987 and 1986, and the consolidated results of their operations and changes in financial position for each of the three years in the period ended December 31, 1987, in conformity with generally accepted accounting principles applied on a consistent basis.

Coopers & Lybrand

Los Angeles, California
February 16, 1988, except for Note 11
as to which the date is February 29, 1988.

Market for the Company's Stock and Related Security Holder Matters

At December 31, 1987, the number of holders of record of the Company's capital stock was as follows:

Title of Class:	Number of Record Holders:
Common Stock, $1 par value	2,231

The high and low sales prices for the stock for each quarterly period the past two years was as follows:

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter	
	High	Low	High	Low	High	Low	High	Low
1987	26	20 3/8	34 1/2	25 3/4	33	27 3/4	37 1/2	22
1986	18 5/8	13 1/4	19	17 3/8	19 1/4	14 7/8	21 1/2	18 3/8

Market:
Common Stock traded on:
New York Stock Exchange
Pacific Stock Exchange
Midwest Stock Exchange, Inc.
Symbol: CZM

Registrar and Transfer Agent:
Security Pacific National Bank, 333 So. Beaudry, 24th Floor, Los Angeles, CA 90017

Officers

William Jenkins
Chairman of the Board

A. Frederick Gerstell
President, Chief Executive Officer and Chief Operating Officer

Ronald E. Evans
Executive Vice President and General Manager, Cement Division

Michael J. Kerstetter
Executive Vice President and General Manager, Concrete & Aggregates Division

Thomas M. Linden
Executive Vice President and General Manager, Properties Division

Ronald C. Hadfield
Senior Vice President, Finance Chief Financial Officer

Scott J Wilcott
Senior Vice President, Legal Counsel and Secretary

Gene R. Block
Vice President, Properties

David S. Cahn
Vice President, Regulatory Matters

Wilbur B. Jager
Vice President, Marketing

John G. S. Mills
Vice President, Chief Accounting Officer

Thomas J. Kelleher
Treasurer and Assistant Secretary

Brian W. Ferris
Assistant Secretary

Directors

Alfred D. Boyer
Executive Vice President
North American Operations
Industrial Equity (Pacific) Limited

Harry M. Conger
Chairman, President and Chief Executive Officer
Homestake Mining Company

A. Frederick Gerstell
President, Chief Executive Officer and Chief Operating Officer

Bert A. Getz
President
Globe Corporation

Richard A. Grant
Trustee, Secretary-Treasurer
The Dan Murphy Foundation

Grover R. Heyler
Attorney, Partner, Latham & Watkins

Albert J. Hicks
Partner, Coopers & Lybrand (Ret.)

William T. Huston
Chairman of the Board and Chief Executive Officer
Watson Land Company

William Jenkins
Chairman of the Board

Oscar T. Lawler
Retired Chairman of the Executive Committee
Security Pacific National Bank

Thomas M. Linden
Executive Vice President and General Manager
Properties Division

Thomas L. Lowe
Director, Monarch Bancorp
Formerly Chairman
The Newhall Land & Farming Company

Stuart T. Peeler
Chairman and Chief Executive Officer
Statex Petroleum, Inc.

Harold H. Short
Chairman of the Board
Flatiron Companies

Robert G. Sutherland
Executive Vice President
North American Operations
Industrial Equity (Pacific) Limited

Subsidiaries

CalMat Co. of Arizona
1801 E. University Drive
Phoenix, AZ 85034
Tel: (602) 254-8465

CalMat of Central California
8517 Panama Lane
Bakersfield, CA 93389
Tel: (805) 834-4711

CalMat Properties Co.
3200 San Fernando Road
Los Angeles, CA 90065
Tel: (213) 258-2777
8885 Rio San Diego Drive, Ste 240
San Diego, CA 92108
Tel: (619) 298-5800

Industrial Asphalt
6623 Calle Eva Miranda
Azusa, CA 91702
Tel: (818) 969-7951

CalMat Co. is an equal opportunity employer.

Designed by O'Mara Design Group, Inc.

CalMat

3200 San Fernando Road
Los Angeles, CA 90065

LAW ENVIRONMENTAL

DOCUMENTS REQUESTED BY THE EPA

FOR HEWITT LANDFILL (closed) NORTH HOLLYWOOD DISTRICT, LOS ANGELES, CALIFORNIA

FOR CALMAT COMPANY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

RECEIVED
LAW ENVIRONMENTAL, INC.
SEP 28 1988
File..............................

CERTIFIED MAIL NO. #P 841 502 256
RETURN RECEIPT REQUESTED

22 SEP 1988

In Reply
Refer to: T-4-1

RECEIVED
SEP 26 1988
CALMAT PROPERTIES

George Crosby
Vice President
Calmat
3200 San Fernando Rd
Los Angels, CA 90065

Dear Mr. Crosby:

The United States Environmental Protection Agency (EPA) and the Los Angeles Department of Water and Power are conducting an investigation of ground-water contamination in the San Fernando Valley to determine the nature, cause and extent of contamination in the ground-water basin. The investigation will also assess the effects of the contamination on the environment and public health.

Part of this investigation will include identifying sources of contamination within the ground-water basin. EPA has reason to believe that your company may be in possession of needed information. Under the provisions of Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9604, and Section 3007 of the Resource Conservation and Recovery Act, as amended by the Solid Waste Disposal Act Amendments of 1980 (RCRA), 42 U.S.C. 6927, the Administrator of the Environmental Protection Agency has the authority to require any person who generates or has generated or otherwise handled hazardous wastes and/or hazardous substances to furnish information regarding its operations. The words "hazardous substances," "hazardous waste," and "person" are defined in 42 U.S.C. Section 9601 (14) of CERCLA, and the questions below. Pursuant to these statutory provisions, you are hereby requested to provide the following information for the landfills located at 7245 Laurel Canyon in North Hollywood, California, and 11500 Foothill Blvd. in Sun Valley, California, and <u>any other location in the San Fernando Valley</u>:

1. A description of the purpose and operations of your facility including, but not limited to, a detailed description of any hazardous waste storage, treatment, or disposal operations. Include the dates of operation.

2. Please provide us with the following information regarding any municipal trash or other non-manifested materials which were taken to your landfill during its operation:

   (a) The name of the city, refuse collection service, company or individual who generated or brought the material to the landfill (if a collection service brought material to the landfill on behalf of a city, please provide the names of both entities, and indicate their relationship);

   (b) The volume or amount of the material;

   (c) The amount billed and/or paid for the disposal of each material at the landfill;

   (d) The period of time during which each entity disposed of such material at the landfill and the frequency of disposals (e.g., weekly, ten-times per day, etc.); and

3. Any photographs, maps, diagrams regardless of their date, which show areas where hazardous substances or hazardous wastes have been or <u>may</u> be located.

4. A description of past and present disposal practices of hazardous substances and hazardous wastes at your facility.

5. Locations and detailed descriptions of all monitoring wells, supply wells, injection wells, and underground tanks at your facility.

6. All analyses from sampling of monitoring and supply wells, underground tanks, soil samples, and soil-gas sampling conducted at your facility. Please include any reports written by consultant(s) about these sample analyses.

7. Are you or your consultants planning to perform any investigations of the soil, water (ground or surface), geology, geohydrology, or air quality on or about the site? If so, please describe the planned investigation(s).

8. A list of all current and former employees, agents, contractors, consultants, company officers, and other personnel who may possess knowledge or information relevant to this inquiry. This list should include each individual's name, address, telephone number, and job title or function.

9. Length of time your company has been at the site location and any information you have regarding former occupants of this location and their hazardous waste practices.

10. Any information regarding use and disposal of chlorinated solvents by any person or business in the San Fernando Valley.

11. A descriptive list of all insurance policies held by your company. The description should include the dates during which each policy was in force, the general type of policy (e.g., comprehensive, general liability, automobile), the insurance company issuing the policy, the policy number, and any specific provision of the policy which may relate to claims for environmental damages.

12. A detailed description of all hazardous substance and hazardous waste spills, leaks, and incidents, as well as any clean-up actions undertaken during the history of your facility's operation.

13. An audited set of financial statements which includes a Statement of Financial Position/Balance Sheet, Income Statement, and Statement of Changes in Working Capital, and any other supplementary information for your company's most recent fiscal year.

14. Are you owned by another corporate entity as a subsidiary, division, or otherwise? If so, list owner(s).

Please answer each question separately. Documents supplied should be labeled with the number of the question that the documents address.

Your response to this request for information must be sent to EPA within thirty (30) calendar days of your receipt of this letter and should be directed to:

Alisa Greene and/or Patti Cleary
U.S. Environmental Protection Agency
Region IX (T-4-1)
215 Fremont Street
San Francisco, CA 94105

Under Section 3008 of RCRA, U.S.C. 6928, failure to comply with this request may result in an Order requiring compliance or a civil action for appropriate relief, including penalties. Failure to comply with this request under Section 104 of CERCLA may also result in a civil enforcement action against you by EPA. In addition, Section 3008(d) of RCRA imposes criminal penalties against any person who knowingly makes any false statement or misrepresents in responding to a request for information issued under Section 3007 of RCRA.

EPA regulations governing confidentiality of business information are set forth in Part 2, Subpart B of Title 40 of the Code of Federal Regulations. For any portion of the information submitted which you believe is entitled to confidential treatment, a confidentiality claim may be asserted in accordance with 40 C.F.R., Section 2.203(b). If EPA determines that the information so designated meets the criteria set forth in 40 C.F.R., Section 2.203, the information will be disclosed only to the extent, and by means of the procedures specified in 40 C.F.R. Part 2, Subpart B. EPA will construe the failure to furnish a confidentiality claim with response to this letter as a waiver of that claim, and the information may then be made available to the public by EPA without further notice.

Please include in your response to this request a notarized affidavit from a responsible company official stating that a diligent record search has been completed and that there has been a diligent interview of present and former employees who may have knowledge of operations, chemical use and storage, and business practices. Also include in the affidavit a statement that all information responsive to this request has been forwarded to the Agency.

Please give this matter your immediate attention. If you have any questions concerning this letter, please contact Alisa Greene at (415)974-8159 or Patti Cleary at (415)974-8015.

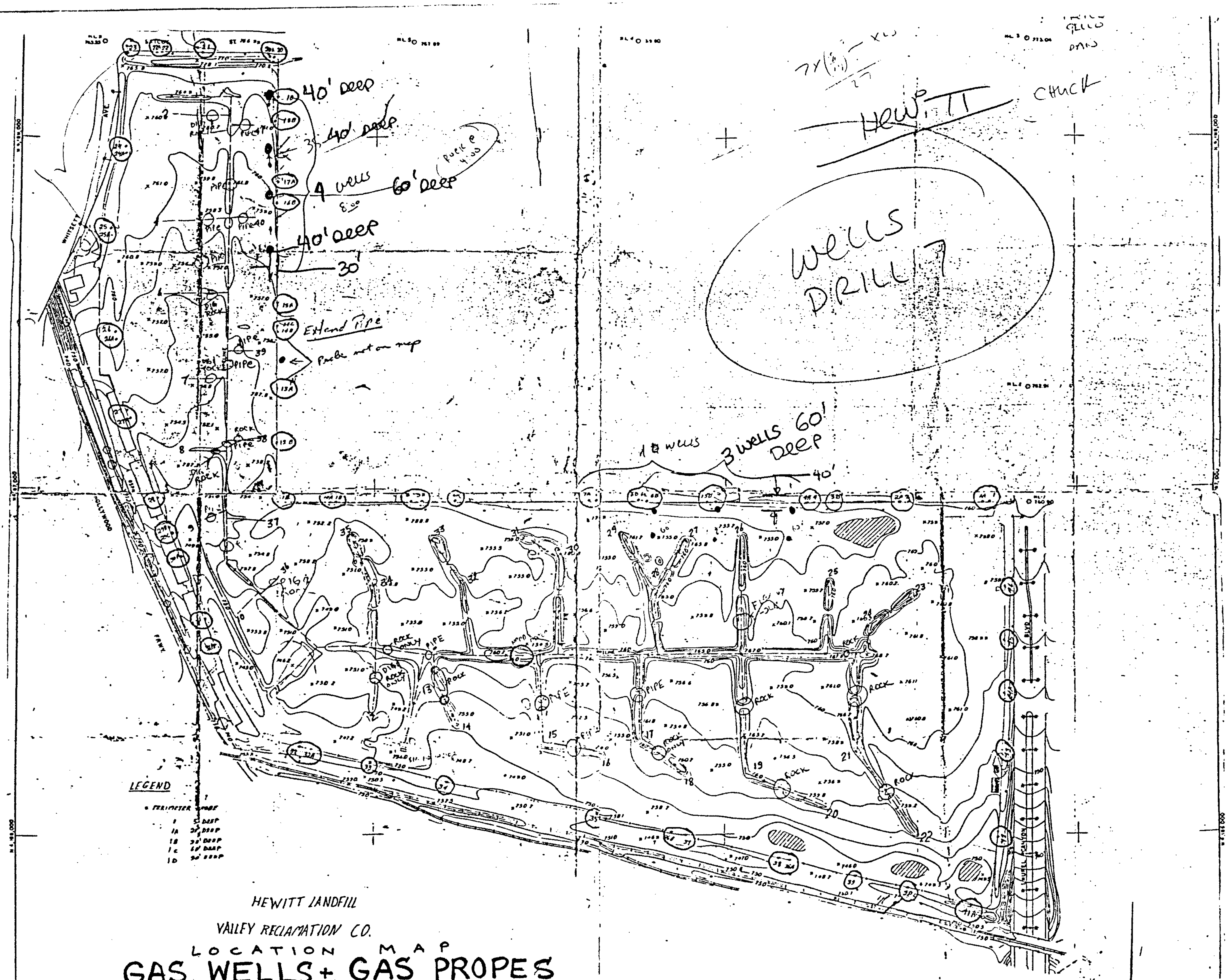
Sincerely,

Jeff Zelikson
Director
Toxics and Waste Management Division

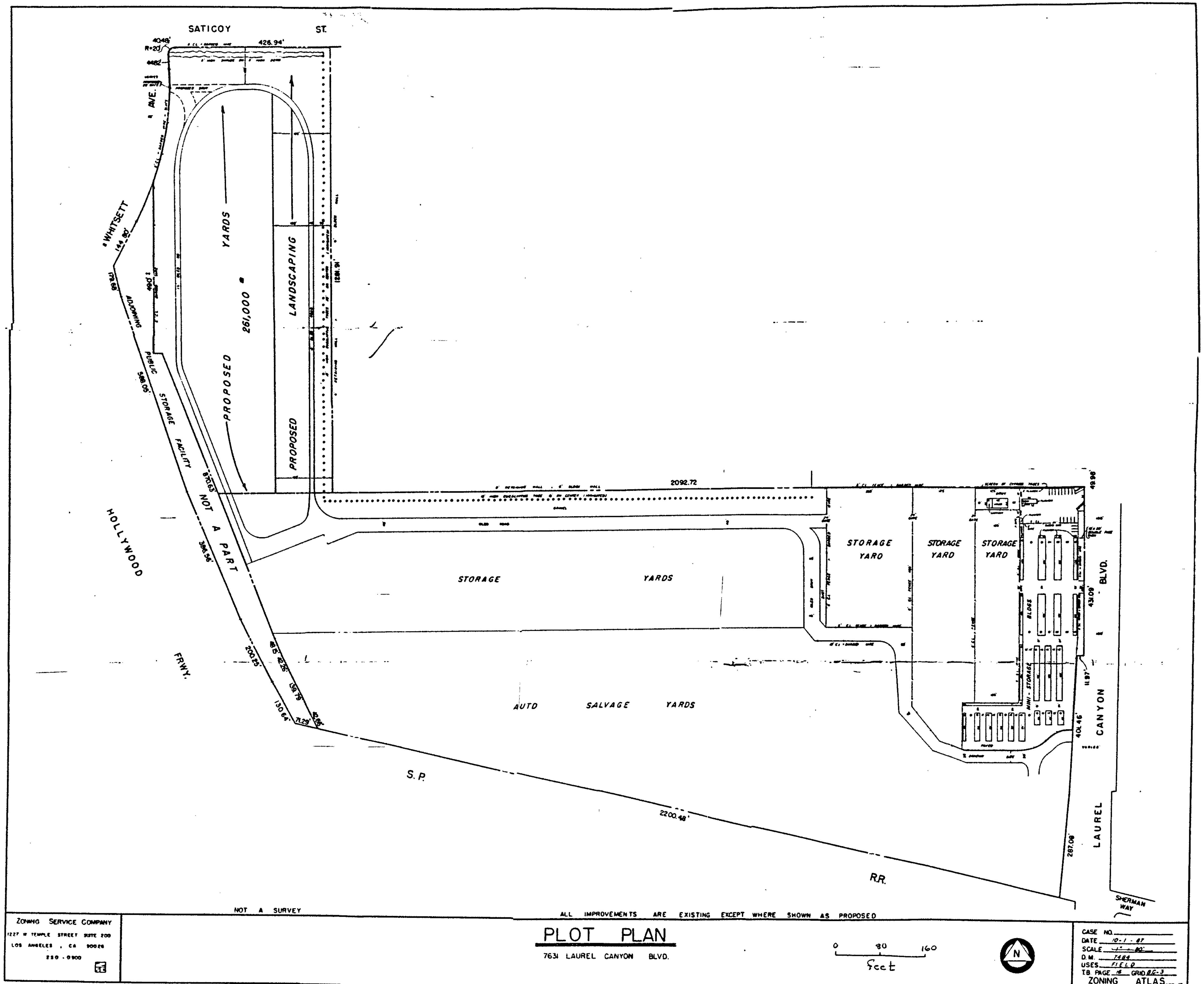
cc: Jon Wactor, ORC-EPA

IDENTICAL LETTERS SENT TO:

	Landfill Location	Addressee
1.	Brand Park Landfill 1601 W. Mountain St. Glendale CA 91207	George Miller Public Works Dept City of Glendale 541 W. Chevy Chase Dr. Glendale, CA 91204-1813
2.	Penrose Pit No. 7 and No.8 8251 Tujunga Ave. Sun Valley, CA 91352	C.D. Van Gordon President L.A. by-Products Co. 1810 E. 25th St. Los Angeles, CA 90058
3.	Toyon Canyon 5050 Mt. Hollywood Drive Los Angeles, CA 90028	Bob Alpern Bureau of Sanitation Waste Management Div. 200 n. Main St. City Hall East, Rm 1420 Los Angeles, CA 90012

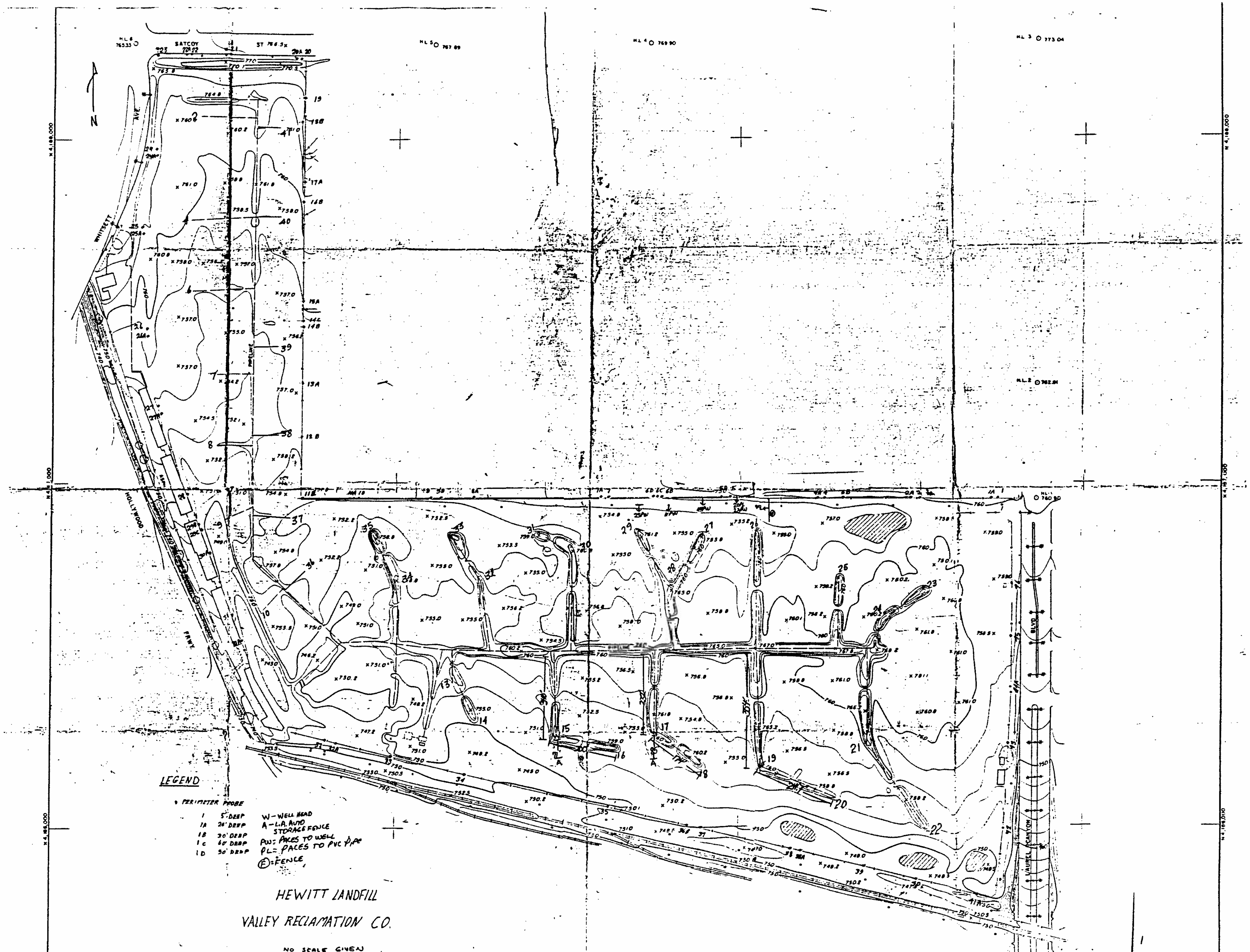

40' DEEP
40' DEEP
4 WELLS 60' DEEP
40' DEEP
30'
Extend Pipe
Probe not on map
HEWITT
CHUCK
WELLS DRILL?
10 WELLS
3 WELLS 60' DEEP
40'
LEGEND
HEWITT LANDFILL
VALLEY RECLAMATION CO.
LOCATION MAP
GAS WELLS + GAS PROPES

2166-01286



SATICOY ST.
426.94'
WHITSETT AVE.
PROPOSED YARDS 261,000
PROPOSED LANDSCAPING
ADJOINING PUBLIC STORAGE FACILITY
NOT A PART
HOLLYWOOD FRWY.
2092.72
STORAGE YARDS
STORAGE YARD
STORAGE YARD
STORAGE YARD
MINI-STORAGE BLDGS
AUTO SALVAGE YARDS
S.P. R.R.
2200.48'
LAUREL CANYON BLVD.
SHERMAN WAY
NOT A SURVEY
ALL IMPROVEMENTS ARE EXISTING EXCEPT WHERE SHOWN AS PROPOSED
ZONING SERVICE COMPANY
1227 W TEMPLE STREET SUITE 200
LOS ANGELES, CA 90026
250-0900
PLOT PLAN
7631 LAUREL CANYON BLVD.
0 80 160
feet
N
CASE NO.
DATE 10-1-87
SCALE 1" = 80'
D.M. 7484
USES FIELD
ZONING ATLAS

2166-01286



GAS PROBES + GAS WELLS
LOCATION MAP

2166-01286

PROPOSED SOLID WASTE ASSESSMENT TEST
MONITORING PROGRAM
(SWAT)
HEWITT CLASS 2 DISPOSAL SITE
SUN VALLEY DISTRICT, LOS ANGELES, CALIFORNIA
FOR
CALMAT CO.
(OUR JOB NO. E-87057)

LeROY CRANDALL AND ASSOCIATES geotechnical consultants □ 900 grand central avenue □ glendale, california 91201-3009 □ (818) 243-4140
a subsidiary of Law Engineering Testing Company

March 31, 1987

CalMat Co.
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-87057)

Attention: Mr. George Cosby

Gentlemen:

As required by Assembly Bill No. 3525 (Calderon Bill), we have prepared this "Proposed Solid Waste Assessment Test Monitoring Program (SWAT), Hewitt Class 2 Disposal Site, Sun Valley District, Los Angeles, California, for CalMat Co." This report provides for the monitoring required under AB 3525.

If you have any questions regarding the contents of this report, please do not hesitate to contact us.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by Alice M Campbell
Alice M. Campbell, C.E.G. 1157
Project Hydrogeologist

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

SE16/sle
(5 copies submitted)

PROPOSED SOLID WASTE ASSESSMENT TEST

MONITORING PROGRAM

(SWAT)

HEWITT CLASS 2 DISPOSAL SITE

SUN VALLEY DISTRICT, LOS ANGELES, CALIFORNIA

FOR

CALMAT CO.

(OUR JOB NO. E-87057)

TABLE OF CONTENTS

PROPOSED SOLID WASTE ASSESSMENT TEST
MONITORING PROGRAM
(SWAT)
HEWITT CLASS 2 DISPOSAL SITE
SUN VALLEY DISTRICT, LOS ANGELES, CALIFORNIA
FOR
CALMAT CO.

SCOPE

This report presents the proposed Solid Waste Water Quality Assessment Test (SWAT) Monitoring Program for this disposal facility. The purpose of this plan is to recommend the ground and surface water monitoring plan required under Assembly Bill No. 3525 (Calderon Bill).

No monitoring program has been required at this site, although two monitoring wells were required to be installed by the City of Los Angeles Landfill task force in 1984-85. No monitoring program ensued.

This proposed program does not include surface water sampling of the Tujunga Wash (an ephemeral stream), 1 mile west, which is a concrete lined channel with no ground water continuity.

For this study, we obtained water levels and water quality data for wells within a one-mile radius of the site. We also determined the ownership of the wells, the depth of presently existing wells in the vicinity of the landfill, and assessed the suitability of the wells for use as monitoring wells.

Our study included review of well data at the Los Angeles County Flood Control District office, Los Angeles Department of Water and Power and a review of published data from the California Department of Water Resources and the California Regional Water Quality Control Board. This report is based on available information from site records, operators, and agency files. No warranty as to the completeness or accuracy of these accounts is made.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

This report was prepared under the supervision of a Certified Engineering Geologist with a minimum of 5 years experience in ground water hydrology.

INTRODUCTORY DATA

A.	Site Name:	Hewitt Landfill
B.	Owner:	CalMat Company
	Operator:	Los Angeles By-Products, Valley Reclamation Company
	AKA:	Site No. 6, San Fernando (California DWR, 1959)

C. Site Location: Laurel Canyon Boulevard
T2N, R15W Section 36 Q
T1N, R15W Section 1A and B
County Assessor's Parcel
No. 2307-022-010

D. Site Use: Site was open to public between 1962 and November 12, 1975.

E. There are no known present enforcement orders or civil liability complaints.

F. The site closed in 1975. The site was covered with an 11 foot surcharge and 3 feet of fill. In 1983 and 1985, additional fill was placed to refill subsidence depressions. Gas extraction commenced in 1975 with the extraction system being expanded in 1983.

The site covers 70± acres and is about 150 feet deep.

Hewitt Landfill was operated by Los Angeles By-Products under a lease arrangement with Conrock Co. (now CalMat Co.). It was a daily-cover type sanitary landfill. It is reported that some trash was flooded early in the life of the landfill when heavy rains caused water to impound behind a temporary embankment off-site. This water was pumped out of the pit by the embankment's builder. There are no other known unusual events during the life of the landfill. A gas control system was installed during the mid-1970s, triggered by complaints of gas migration after the site was closed and capped. Horizontal migration commonly occurs when vertical migration is prevented by a low-permeability cover. Gas production has been declining since withdrawal began, and has never been economic. Methane content has dropped to 15-20%. Settlement has occurred, although the rate has declined. As a result of settlement, the site has over nine feet of cover over most of the area. Part of the site is currently paved with asphalt.

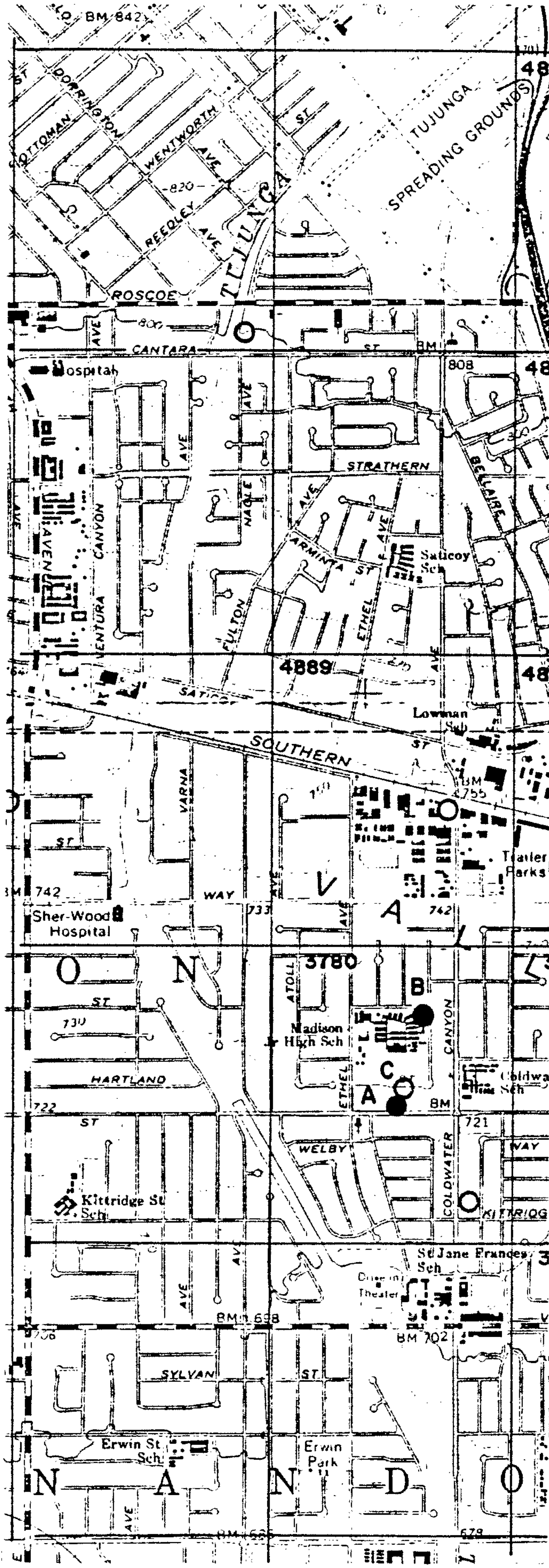
GROUND WATER MONITORING PLAN SELECTION

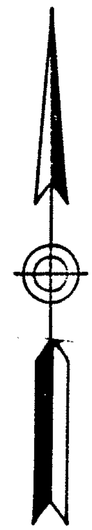
At the request of the City of Los Angeles Landfill Monitoring Task Force, two monitoring wells were installed at Hewitt in late 1984. This program is considered sufficient because there are no known problems and the site had been closed for 10 years. The locations of existing wells in the vicinity of the site are given on Figure 1. In selecting well locations to monitor this site, we have taken into account the direction of ground water movement which is historically from northwest to southeast. Figure 2, Monitoring Plan, shows ground water movement as of spring 1980. Our survey of well data indicates that there are three existing wells that can also be used to monitor the site. Sampling of these wells provides: 1) the background water quality, and 2) the quality of water passing the site. Using an off-site monitoring well is recommended because water quality data are abundant and can be used to reconstruct water quality during the life of the site.

PROPOSED MONITORING WELL NETWORK

We recommend that the two existing wells and one off-site well be sampled. The monitoring well network would include one upgradient well and two downgradient wells. The locations of the three wells are also shown on Figure 1. Table 1, Well Information, presents available ownership and construction details for the wells. The well log of the upgradient well is presented in Appendix A.

97891





XPLANATION:

EXISTING WELL

ABANDONDED OR DESTROYED WELL

WELL USED FOR SWAT

COUNTY WELL GRID NUMBER

ERENCES:

ASE MAP FROM U.S.G.S. 7.5'
BANK AND VAN NUYS QUADRANGLES
TOREVISED1972 .

LOCATION MAP

EWITT LANDFILL

LeROY CRANDALL AND ASSOCIATES

FIGURE 1

JOB E-87051 DATE 3/24/87 DR. M.G. CHKD

EXPLANATION:

- ● MONITORING WELL
- U⊙ LYSIMETER
- L⊙ LEACHATE TEST HOLE
- ↘ REGIONAL GROUND WATER FLOW, SPRING 1980

REFERENCE: BASE MAP FROM U.S.G.S. 7½' VAN NUYS QUADRANGLE, 1972.

0 2000 3000

SCALE IN FEET

MONITORING PLAN

HEWITT LANDFILL

LeROY CRANDALL AND ASSOCIATES

FIGURE 2

Table 1
WATER WELLS

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3780	225	16	16	?	?	?		None	?	No	No
3780A	597	20	20	?	?	City of Los Angeles	1929	None	?	Yes	No
3780B	145	3/4	?	?	?	?	1929	None-capped	?	No	No
3780C	787	?	?	?	?	L.A. Dept. of Water & Power	1963	Municipal Supply	?	Yes	No
3790	375	20	20	?	?	?	1924	Destroyed 1959	?	Yes	No
3790A	546	20	20	?	?	City of Los Angeles	1929	Destroyed 1959	?	?	No
3790B	467	?	?	?	?	City of Los Angeles	1931	Municipal Supply	?	?	No
3790C	494	20	20	?	166 - 178 200 - 225 250 - 266 274 - 304 308 - 366 421 - 460	E.A. Buss	1948	?	?	Yes	No
3790D	481	20	20	?	222 - 298 367 - 298 432 - 460	L.A. Dept. of Water & Power	1951	Municipal Supply	?	Yes	No
3790E	596	20	20	?	220 - 262 275 - 370 418 - 452	Fred Aleanter	1959	Municipal Supply	?	Yes	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3790F	570	20	20	Cable Tool	160 - 187 198 - 340 348 - 376 412 - 445 465 - 540	L.A. Dept. of Water & Power Municipal Supply	1958	L.A. Dept. Water & Power	?	Yes	Yes
3790G	760	20	20	?	?	L.A. Dept. of Water & Power	1964	None-Capped 4-64	?	Yes	?
3790H	802	20	20	?	265 - 370 432 - 462 502 - 648 700 - 720	L.A. Dept. of Water & Power	1967	?	?	Yes	?
3790J	No Information										Yes
3791	91	8	8	No Information							Yes
3791A	No Information							Destroyed 1950	No Information		
3791B	No Information							Destroyed 1950	No Information		
3800	393	20	20	?	105 - 135 172 - 276 282 - 309 318 - 374	So. California Drilling Co.	1924	Domestic & Irrigation	?	No	No
3800A	583	16	16	?	160 - 535	F.E. Griswold	1924	Municipal Supply	?	No	No
3801	109	7	7	?	?	?	Prior to 1947	Abandoned	?	No	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3810	495	20	20	?	?	?	Prior to 1924	Municipal Supply	?	Yes	No
3810A	465	?	?	?	110 - 225 245 - 302 327 - 392	?	?	Municipal Supply	?	Yes	No
3810B	419	?	?	?	120 - 149 155 - 181 185 - 214 220 - 265 320 - 387	H.E. Bredehoft	1947	Municipal Supply	?	Yes	No
3810C	No Information										
3810D	No Information										
3810E	No Information							Destroyed 7/50			
3810G	150	20	20	?	?	?	?	Casing Sealed 4/66	?	No	No
3810H	350	12	12	?	?	?	?	Capped 7/66	?	No	No
3810J	150	20	20	?	80 - 150	M.R. Peck & Sons	1957	None - Sealed 4/66	?	Yes	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3810K	812	20	20	Cable Tool	250 - 258 292 - 392 535 - 603 631 - 660 710 - 760	L.A. Dept. of Water & Power	1962	Municipal Supply	?	Yes	No
3810L	714	20	20	?	?	L.A. Dept. of Water & Power	?	Municipal Supply	?	Yes	No
3810M	822	20	20	Cable Tool	300 - 395 435 - 443 475 - 510 565 - 625 650 - 692 736 - 795	L.A. Dept. of Water & Power	1968	Municipal Supply	?	Yes	Yes
3810N	855	20	20	Cable Tool	300 - 305 333 - 395 423 - 484 490 - 515 550 - 620	L.A. Dept. of Water & Power	1969	Municipal Supply	?	Yes	Yes
3810P	865	20	20	Cable Tool	308 - 323 328 - 407 418 - 425 435 - 448 514 - 575	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	Yes
3810Q	640	20	20	Cable Tool	248 - 275 280 - 346 358 - 400 420 - 454 480 - 520	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	Yes

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3810R	738	20	20	Cable Tool	280 - 406 448 - 460 494 - 497 503 - 522 533 - 538	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	No
3810S	414	20	20	?	110 - 142 162 - 221 245 - 288 297 - 391	So. Calif. Drilling Company	1924	Municipal Supply	?	Yes	No
3810T	687	20	20	?	205 - 222 250 - 280 327 - 389 405 - 413 422 - 433	L.A. Dept. of Water & Power	1963	Municipal Supply	?	Yes	No
3800C	555	20	20	?	206 - 246 260 - 283 318 - 338 338 - 410 464 - 508 514 - 534	H.E. Bredehoft	1954	Municipal Supply	?	Yes	No
3800D	770	20	20	?	255 - 275 318 - 396 573 - 583 645 - 676	L.A. Water District	1962	?	?	Yes	No
3811	90	?	?	?	?	C.E. Tomson	1916	Destroyed 7/50	?	No	No
3811A	96	?	?	?	?	?		Destroyed 3/50	?	No	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3811B	?	7	7	No Information							
3811C	?	12	12	?	?	?	?	Capped 4/59	?	No	No
3811D	No Information							Destroyed 1924	No Information		
3811E	248	8	8	?	110 - 147 168 - 178 182 - 226	Elmer A. Buss	1945	Observation	?	Yes	No
3811F	632	20	20	?	204 - 214 270 - 313 365 - 380 425 - 446 447 - 491 522 - 542 555 - 600	C.A. Tomson H.E. Bredehoft	1953	Municipal Supply	?	Yes	No
3811G	601	20	20	?	190 - 227 274 - 319 344 - 352 360 - 367 407 - 427 445 - 461 543 - 549	C.A. Tomson H.E. Bredehoft	1953	Municipal Supply	?	Yes	No
3820	?	?	?	?	?	C.A. Tomson	?	Municipal Supply	?	No	No
3820A	?	?	?	?	?	?	1915	Destroyed 7/50	?	No	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
3820B	No Information						1930	Municipal Supply	No Information		
3820C	No Information					L.A. Water Department	1930	Municipal Supply	No Information		
3820D	No Information					L.A. Water Department	1930	Municipal Supply	No Information		
3820E	512	20	20	?	150 - 175 185 - 204 232 - 274 284 - 369 501 - 509	L.A. Water Department	1951	Municipal Supply	?	Yes	No
3820F	780	20	20	?	?	L.A. Water Department	1959	Municipal Supply	?	Yes	No
3820G	No Information										
4895B	No Information										
4897	450	20	?			L.A. Dept. of Water & Power	1932	Monitoring	?	Yes	Yes
4897A	370	8	8	?	60 - 75 90 - 105 130 - 145 180 - 370	L.A. Dept. of Water & Power	1963	Ground Water Observation	?	Yes	Yes
4889	148	?	?	?	?	C.E. Tomson	1916	?	?	Yes	No
4898	363	20	20	?	250 - 330	L.A. Dept. of Water & Power	1974	?	?	Yes	Yes

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
4919	197	12	12	?	?	?	?	None - Destroyed or Collapsed Casing		No	No
4919A	128	?	?	?	?	?	1934	Domestic	?	No	No
4919B	156	6	?	Excavated		A.R. Tomson	1948	Observation	?	No	No
4919D			No Information								
4929	731	20	20	?	200 - 214 264 - 217 350 - 473 487 - 502 562 - 572 586 - 638 658 - 714	C.A. Tomson	1983	None Capped	?	Yes	Yes
4818		No Information				L.A. Dept. of Water & Power	1984	No Information			
4918A					No Information						
4909	No Information							None - Destroyed 11/24/50	?		
4909A	254	16	16	?	?	So. Calif. Drilling Co.	1924	Destroyed 1944	?	Yes	No
4909B	326	16	16	?	230 - 270 300 - 314	Saunders Bros.	1952	Sand & Gravel Washing	?	Yes	No

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available
4909C	500 (approx.)	6	6	No Information		?	?	Monitoring	?	Yes	Yes
4899	290	12¼	12¼	Rotary	120 - 280	Howard Pump	1984	Monitoring	0 - 110	Yes	Yes

BACKGROUND WATER QUALITY

Available water quality analyses for the McBride (4889) well 3,000 feet upgradient and the Hewitt upgradient well were reviewed and compared with water quality at the downgradient well. LADWP Well 3800C is reported to have good records of VOCs for several years. The McBride Well (4889) is downgradient of Sheldon-Arleta Landfill. The available analyses are attached. Water analyses including VOCs are available for several LADWP supply wells downgradient.

Preliminary review of the local water analyses shows that upgradient water has quite high levels of TDC, 1,1DCA, TCE, and other trace priority pollutants. Except for TCE and 1,1,1 TCA, these are not present in the downgradient well, although they are present in the LADWP supply well. Sodium is higher upgradient, chloride is higher downgradient. There is no apparent decrease or increase in hardness attributable to landfill gas at the downgradient well. This is consistent with an old landfill with declining gas production, particularly at the base of the fill.

SAMPLING PLAN

TYPE OF ANALYSIS

All the wells will be sampled for the following water quality analyses:

Parameters	Units
EPA 624 (vol. pri. poll)	ug/l
625 Acid/Base extractibles	ug/l
ICP metals	mg/l
General mineral analysis	mg/l
Field parameters - Temperature, pH, and E.C.	

The laboratory will add any other breaks or peaks of concern.

LEACHATE SAMPLING

One hole will be drilled through refuse to obtain information on the moisture levels within the trash. The hole will be completed as a gas well and tied into the gas extraction system. We will observe the drilling, log and sample refuse in this hole. If free liquid is encountered, it will be sampled. We currently have no reason to believe the refuse is saturated, since gas rates are declining and there are no known water quality problems immediately downgradient of the site. Any leachate will be analyzed using EPA 624, 625 and ICAP and AA metals. Compared with experiences at Sheldon-Arleta, where obvious problems were found a mile downgradient, no obvious landfill-related problems have been observed at LADWP's supply wells 2,000 feet downgradient.

UNSATURATED ZONE MONITORING

The Hewitt site, like most other gravel pit sites in the San Fernando Valley, is not suitable for unsaturated zone monitoring. It is underlain by permeable, fast-draining, coarse-grained alluvium consisting of sand and gravel that is not likely to contain enough fine-grained material for proper installation and operation of lysimeters. The lysimeters cannot be installed through trash, which is over 100 feet thick, and slant drilling in the alluvium is unlikely to be successful without using fluid to stabilize the hole.

However, in order to fulfill the SWAT requirement, we will install two lysimeters in bored vertical holes about 50-70 feet deep. One will be near, but not through refuse; the other will be a background point. The lysimeters will be Timco teflon lysimeters. We do not anticipate obtaining enough samples to perform the required analyses, particularly in the summer or fall when there has been no rain for many months. We may obtain enough sample during the winter and spring for EPA 624, chloride, and TDS.

SAMPLING TECHNIQUES

All sampling, sample preservation, and analyses will be performed in accordance with the latest edition of "Guidelines Establishing Test procedures for Analysis of Pollutants", promulgated by the United States Environmental Protection Agency. Samples will be bailed using dedicated equipment, except that the DWP well would be sampled at the well head.

All chemical and physical analyses will be conducted in a laboratory certified for such analyses by the State Department of Health.

CHAIN OF CUSTODY

Chain-of-custody control will be provided using the laboratory transmittal form (Figure 3). The following excerpt from the sampling plan provides additional explanation of chain-of-custody. Water samples will be collected and water level measurements made by a trained and qualified person.

Proper use of the Laboratory Transmittal Form provides the chain-of-custody record. Its use is outlined below in the Standard Operating Procedures. A completed form is shown on Figure 3. This form has two major functions:

CHAIN OF CUSTODY RECORD

BC Log Number ____________

Client name: Calmat Co

Job number: E87057

Project name: Hewitt SWAT

Project manager: Campbell

Sampler(s):

Sample number	Date sampled	Time sampled	Type Composite or Grab	Sample description	Number of containers	EPA 624	EPA 625	General Mineral	ICAP Metals	AA metals Hg Se	Cl + TDS	Hazardous sample Special handling required	Remarks
1			G	ground water well 4899	7	✓	✓	✓	✓	✓			
2			G	lysimeter upgradient	2	✓					✓		tenax column

	Signature	Company	Date	Time
Relinquished by				
Received by				
Relinquished by				
Received by				
Relinquished by				
Received by				

BROWN AND CALDWELL Analytical Laboratories

☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (213) 681-4655

Note: Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

- o Identification of samples and sampling points, and
- o Documentation of field chain-of-custody, including delivery to laboratory personnel.

Sample Identification

The following items must be checked off on the transmital each time that samples are collected:

1. Sampling point (i.e., location and well number)
2. Name of collector
3. Date and time of sampling
4. Number of containers
5. Analyses required
6. Laboratory where sample will be sent
7. Collector's signature and time

Entries for Items 1, 4, and 5 must be made before leaving each individual sampling point. This documentation procedure is an important quality assurance requirement.

Field Documentation

The transmittal must be signed in ink. One or more signatures must be entered to identify the person or persons who are collecting the samples. Each time the custody of a sample or group of samples is transferred, a signature, date and time are required to document the transfer. The signatures, date and time must be entered at the time of transfer; use both the "Field ID" blank and the "Comments" blank, if necessary, to define exactly which bottles were transferred.

The following quotation is included to clarify the objective and concept of chain-of-custody procedures (Environmental Monitoring and Support Laboratory U.S. Environmental Protection Agency, 1979):

"... must demonstrate the reliability of its evidence by proving the chain of possession and custody of any samples that are offered for evidence or that form the basis of analytical test results introduced into evidence in any water pollution case. It is imperative that the office and the laboratory prepare procedures to be followed whenever evidence samples are collected, transferred, stored, analyzed or destroyed.

The primary objective of these procedure is to create an accurate written record that can be used to trace the possession of the sample from the moment of its collection through its introduction into evidence. A sample is in custody if it is in any one of the following states:

- In actual physical possession,
- In view, after being in physical possession,
- In physical possession and locked up so that no one can tamper with it, and
- In a secured area, restricted to authorized personnel.
- Personnel should receive copies of study plans prior to the study of a water pollution case. Prestudy briefings should then be held to apprise participants of the objectives, sample locations, and chain-of-custody procedures to be followed. After the chain-of-custody samples are collected, a debriefing is held in the field to verify the adherence to the chain-of-custody procedures and to determine whether additional samples are required."

REPORTING

Reports containing the following information will be prepared and filed with the Los Angeles Regional Water Quality Board on a quarterly basis.

1. Analytical results and dates of water samples taken from each monitoring well. If no samples were collected during the reporting period, a statement to that effect will be made and the reason why not given.
2. Quarterly water level elevations in each monitoring well.
3. An evaluation of the results of the water testing.

If no water was detected or pumped during the reporting period, a statement to that effect will be submitted.

Each monitoring report will affirm in writing that all analyses were conducted at a laboratory certified for such analyses by the State Department of Health and in accordance with current EPA Guideline procedures.

For any analysis performed for which no procedure is specified in the EPA Guidelines, the constituents or parameter analyzed and the method or procedure used will be specified in the report.

The results of this monitoring program for the year 1987 will be submitted with the complete Solid Waste Water Quality Assessment Report that is due on January 1, 1988.

PREVIOUS REPORTS

Previous reports by LeRoy Crandall and Associates related to the project include:

Background Hydrogeologic Data, Hewitt Landfill, North Hollywood, California, dated December 1982 (our Job No. E-81001).

Completion Report, Construction of Upgradient Monitoring Well No. 1, Hewitt Landfill, Los Angeles, California, dated March 1, 1985 (our Job No. E-89309).

I certify that this proposal is accurate and complete:

by Glenn A Brown

Glenn A. Brown, C.E.G. 3
Director of Geological Services

Date: March 31 1987

APPENDIX A

WELL LOGS

ORIGINAL
File with DWR

No. of Intent No. Customer
Local Permit No. or Date Customer

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 241871

State Well No.

CBI

[redacted]

HOWARD PUMP,
TEST PUMP DA1..

NAME Valley Reclamation WELL DESIGNATION/LOCATION Hewitt Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS ____ TEST ____ SHEET ____ OF ____

DATE/ TIME 11-6-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
11:00		100		213		
11:05			2	215	Some	
12:25		100	2	215	Little	
1:28		100	2	215	None	
2:30		100	2	215	None	Pump running fine, 32 amps.
3:00		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	Shut down.
11-7-84						
6:00		100	2	215	None	Started pump, slightly cloudy discharge, cleared up quick
7:00		100	2	215	None	
9:00		100	2	215	None	
10:30		100	2	215	None	Poured cement around vault.
11:30		100	2	215	None	
12:30		100	2	215	None	
2:00		100	2	215	None	
3:30		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	
6:00		100	2	215	None	Shut Down.

HOWARD PUMP, INC.
TEST PUMP DATA

NAME Valley Reclamation WELL DESIGNATION/LOCATION: ~~Hewitt~~ Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS TEST SHEET OF

DATE/ TIME 11-8-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
6:30		100	2	215	None	
7:30		100	2	215	None	
8:30		100	2	215	None	
9:30		100	2	215	None	
11:00		100	2	215	None	
12:00		100	2	215	None	End Test.

APPENDIX B

WATER QUALITY MONITORING RESULTS

BROWN AND CALDWELL

ANALYTICAL LABORATORIES

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1 Well [illegible]	27 FEB 87
02-486-2	Sample #2 Well 4209C	27 FEB 87

PARAMETER	02-486-1	02-486-2
Total Organic Carbon (TOC), mg/L	6	<3
Dissolved Digestion, Date	03/02/87	03/02/87

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Vol.Pri.Poll. (EPA-624)		
Extraction	03/13/87	03/13/87
Dilution Factor, Times 1	1	1
1,1,1-Trichloroethane, ug/L	9	4
1,1,2,2-Tetrachloroethane, ug/L	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1
1,1-Dichloroethane, ug/L	46	<1
1,1-Dichloroethylene, ug/L	10	<1
1,2-Dichloroethane, ug/L	<1	<1
1,2-Dichloropropane, ug/L	9	<1
1,3-Dichloropropene, ug/L	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Bromodichloromethane, ug/L	<1	<1
Bromomethane, ug/L	<1	<1
Benzene, ug/L	<1	<1
Chlorobenzene, ug/L	<1	<1
Carbon Tetrachloride, ug/L	<1	<1
Chloroethane, ug/L	<1	<1
Bromoform, ug/L	<1	<1
Chloroform, ug/L	6	<1
Chloromethane, ug/L	<1	<1
Dibromochloromethane, ug/L	<1	<1
Ethylbenzene, ug/L	<1	<1
Methylene Chloride, ug/L	2	<1

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Tetrachloroethylene, ug/L	200	6
Trichloroethylene, ug/L	45	71
Trichlorofluoromethane, ug/L	<1	<1
Toluene, ug/L	<1	<1
Vinyl Chloride, ug/L	<1	<1
trans-1,2-Dichloroethylene, ug/L	21	<1
trans-1,3-Dichloropropene, ug/L	<1	<1
Other Vol.Pri.Poll. (EPA-624)	---	---
Semi-Quantified Results **		
Dichlorofluoromethane, ug/L	70	---

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-1
Sample Description: Sample #1

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L
Nitrate (as NO3)	0.6	0.0097
Chloride	16	0.45
Sulfate	<1	<0.021
Bicarbonate (as HCO3)	340	5.6
Carbonate (as CO3)	0	0
Total Milliequivalents per Liter		6.1

Cations	mg/L	meq/L
Sodium	46	2
Potassium	13	0.33
Calcium (EDTA Titration)	50	2.5
Magnesium	20	1.6
Total Milliequivalents per Liter		6.4

Determination	mg/L
Hydroxide Alk (as CaCO3)	0.0
Carbonate Alk (as CaCO3)	0.0
Bicarb Alk (as CaCO3)	280
Ca Hardness (as CaCO3)	120
Mg Hardness (as CaCO3)	82
Total Hardness (as CaCO3)	202
Iron	<0.02
Manganese	0.050
Copper	<0.02
Zinc	<0.03
Surfactants	<0.1
Filterable Residue (TDS)	300
Sp. Conductance, umhos/cm	570
pH, units	7.5

* Conforms to Title 22, California Administrative Code

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-2
Sample Description: Sample #2

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L
Nitrate (as NO3)	28	0.45
Chloride	35	0.99
Sulfate	56	1.2
Bicarbonate (as HCO3)	350	5.8
Carbonate (as CO3)	0	0
Total Milliequivalents per Liter		8.4

Cations	mg/L	meq/L
Sodium	30	1.3
Potassium	4.4	0.11
Calcium (EDTA Titration)	110	5.5
Magnesium	19	1.6
Total Milliequivalents per Liter		8.5

Determination	mg/L
Hydroxide Alk (as CaCO3)	0.0
Carbonate Alk (as CaCO3)	0.0
Bicarb Alk (as CaCO3)	290
Ca Hardness (as CaCO3)	270
Mg Hardness (as CaCO3)	78
Total Hardness (as CaCO3)	348
Iron	<0.02
Manganese	0.009
Copper	<0.02
Zinc	<0.03
Surfactants	0.0
Filterable Residue (TDS)	450
Sp. Conductance, umhos/cm	760
pH, units	7.6

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O.# 12002

Date Received	1/23/85
Lab. No. (Leave Blank)	14062
Purveyor and Address (include city and county)	VALLEY RECLAMATION - HEWITT PIT
System Number	
Serial Number	C 22426
Sampling Point	NEW WELL #2 - EAST (WTP)
Collected by	RAMSTEDT
Date and Hour Collected	1-23-85 1200
Type of Sample	Other: Obs Well.
Send Report To	RWQCB # 4

Results are expressed as mg/l unless specified

GENERAL MINERAL ANALYSIS (mg/l as Ca CO3): Ca, Mg, Fe Total, Mn, Na, K, pH, Total Dissolved Solids, Hardness, HCO_3, CO_3, OH, Total Alk., Cl, SO_4, F, NO_3 — (not completed)

TRACE ELEMENTS: Al, Ag, As, B, Cd, Cr, Cu, Hg, Pb, Ni, Se, Zn — (not completed)

Other analyses desired (specify): VOA

1,1 dichloroethane = 0.55 ug/l
(c) 1,2 dichloroethylene = 0.87 ug/l
Chloroform = 1.0 ug/l
trichloroethylene = 1.1 ug/l
Perchloroethylene = 2.9 ug/l
p-dichlorobenzene = 2.7 ug/l

Date Reported: 1-24-85
Analyst: P.H.

Turb. TU; Spec. Cond. µmnos/cm; NH_3-N; ORG-N; BOD; Grease; Susp. Solids; Set Solids ml/l/hour; PO_4; MBAS

Form LAB 800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O.# 12002

Date Received	1/23/85
Lab. No. (Leave Blank)	14063
Purveyor and Address (include city and county)	VALLEY RECLAMATION - HEWITT PIT
System Number	
Serial Number	C 22430
Sampling Point	NEW WELL #2 - EAST (WTP)
Collected by	RAMSTEDT
Date and Hour Collected	1-23-85 1030
Type of Sample	Other: TRIP Blank
Send Report To	RWQCB # 4

Results are expressed as mg/l unless specified

GENERAL MINERAL ANALYSIS (mg/l as Ca CO3): Ca, Mg, Fe Total, Mn, Na, K, pH, Total Dissolved Solids, Hardness, HCO_3, CO_3, OH, Total Alk., Cl, SO_4, F, NO_3 — (not completed)

TRACE ELEMENTS: Al, Ag, As, B, Cd, Cr, Cu, Hg, Pb, Ni, Se, Zn — (not completed)

Other analyses desired (specify): VOA

Chloropropene isomer

Date Reported: 1-24-85
Analyst: P.H.

Turb. TU; Spec. Cond. µmnos/cm; NH_3-N; ORG-N; BOD; Grease; Susp. Solids; Set Solids ml/l/hour; PO_4; MBAS

Form LAB 800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O. # 12002

Date Received: 1/23/85
Lab. No. (Leave Blank): 14064
Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT
System Number:
Serial Number: C 22427
Sampling Point: NEW WELL #2 - EAST (WTP)
Collected by: RAMSTEDT
Date and Hour Collected: 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

		(mg/l as Ca CO_3)	
☐ Ca		☐ Hardness	
☐ Mg		☐ HCO_3	
☐ Fe Total		☐ CO_3	
☐ Mn		☐ OH	
☐ Na		☐ Total Alk.	
☐ K		☐ Cl	
☐ pH		☐ SO_4	
		☐ F	
☐ Total Dissolved Solids		☐ NO_3	

TRACE ELEMENTS

☐ Al	
☐ Ag	
☐ As	
☐ B	
☐ Cd	
☐ Cr	
☐ Cu	
☐ Hg	
☐ Pb	
☐ Ni	
☐ Se	
☐ Zn	
☐	

☑ Other analyses desired (specify):
BNA
None detected.

Date Reported: 1-28-85
Analyst: P.H.

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O. # 12002

Date Received: 1/23/85
Lab. No. (Leave Blank): 14066
Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT
System Number:
Serial Number: C 22428
Sampling Point: NEW WELL - EAST (WTP)
Collected by: RAMSTEDT
Date and Hour Collected: 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☑ GENERAL MINERAL ANALYSIS

		(mg/l as Ca CO_3)	
☐ Ca		☐ Hardness	
☐ Mg		☐ HCO_3	
☐ Fe Total		☐ CO_3	
☐ Mn		☐ OH	
☐ Na		☐ Total Alk.	
☐ K		☐ Cl	
☐ pH		☐ SO_4	
		☐ F	
☐ Total Dissolved Solids		☐ NO_3	

TRACE ELEMENTS

☐ Al	
☑ Ag	< 0.001
☑ As	< 0.01
☐ B	
☑ Cd	< 0.001
☑ Cr	< 0.01
☑ Cu	< 0.01
☑ Hg	< 0.001
☑ Pb	< 0.01
☑ Ni	< 0.01
☑ Se	< 0.01
☑ Zn	< 0.01
☐	

☑ Other analyses desired (specify):
(HM)

Sb — < 0.01 mg/l
Be — < 0.001 mg/l
Tl — < 0.01 mg/l
Cr+6 = < .001 ug/ml

Date Reported: 2-6-85
Analyst: NP CL ST

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California · Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.Q. # 12002

Date Received: 1/23/85 (Leave Blank)

Lab. No. 14065

Purveyor and Address (include city and county): VALLEY RECLAMATION – HEWITT PIT

System Number:

Serial Number: C 22429

Sampling Point: NEW WELL – EAST (S+P)

Collected by: RAMSTEDT

Date and Hour Collected: 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☑ GENERAL MINERAL ANALYSIS

			(mg/l as Ca CO_3)
☐ Ca	128.	☐ Hardness	445.
☐ Mg	31.	☐ HCO_3	492.
☐ Fe Total	0.6	☐ CO_3	0.
☐ Mn	<0.02	☐ OH	0.
☐ Na	41.	☐ Total Alk.	492.
☐ K	4.7	☐ Cl	18.
☐ pH	7.6	☐ SO_4	27.
		☐ F	0.29
☐ Total Dissolved Solids	569	☐ NO_3	4.9

TRACE ELEMENTS

☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

COD – 2.4 mg/L

CN^- – <0.001 mg/L

Phenol – <0.001 mg/ml

Date Reported: 2-4-85

Analyst: RSNT ML MO

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
1-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	5
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as CaCO3), mg/L	0.0
Bicarbonate (as CaCO3), mg/L	450
Hydroxide Alk (as CaCO3), mg/L	0.0
Total Alkalinity (as CaCO3), mg/L	450
alcium (EDTA Titration), mg/L	75
Magnesium, mg/L	26
hloride, mg/L	17
opper, mg/L	<0.14
Surfactants, mg/L	<0.10

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
1-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1			
Iron, mg/L	<0.13			
Manganese, mg/L	<0.04			
pH Units	7.2			
Potassium, mg/L	5.0			
Sodium, mg/L	33			
Sulfate, mg/L	26			
Specific Conductance, umhos/cm	810			
Filterable Residue, mg/L	760			
Zinc, mg/L	<0.018			
Nitrate (as NO3), mg/L	7.5			
Nitric Acid Digestion, Date	01/29/85			
Chemical Oxygen Demand, mg/L	<3.0			

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L
Nitrate (as NO3)	7.5	0.1
Chloride	17	0.5
Sulfate	28	0.6
Bicarbonate (as CaCO3)	450	7.3
Carbonate Alk (as CaCO3)	0.0	0.0
Total Milliequivalents per Liter		8.5
Cations	**mg/L**	**meq/L**
Sodium	33	1.4
Potassium	5.0	0.1
Calcium (EDTA Titration)	75	3.7
Magnesium	28	2.3
Total Milliequivalents per Liter		7.6

Determination	mg/L
Hydroxide Alk (as CaCO3)	0.0
Carbonate Alk (as CaCO3)	0
Bicarbonate Alk(as CaCO3)	367
Ca Hardness (as CaCO3)	187
Mg Hardness (as CaCO3)	115
Total Hardness	302
Iron	<0.13
Manganese	<0.04
Copper	<0.14
Zinc	<0.018
Surfactants	<0.10
Filterable Residue	760
Sp. Conductance, umhos/cm	810
pH, units	7.2

* Conforms to Title 22, California Administrative Code

Edward Wilson

Edward Wilson, Laboratory Director

BROWN AND CALDWELL ANALYTICAL LABORATORIES

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
1,1,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	6
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as CaCO3), mg/L	0.0
Bicarbonate (as CaCO3), mg/L	450
Hydroxide Alk (as CaCO3), mg/L	0.0
Total Alkalinity (as CaCO3), mg/L	450
Calcium (EDTA Titration), mg/L	75
Magnesium, mg/L	26
Chloride, mg/L	17
Copper, mg/L	<0.14
Surfactants, mg/L	<0.10

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
.-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1			
Iron, mg/L	<0.13			
Manganese, mg/L	<0.04			
Units	7.2			
Potassium, mg/L	5.0			
Sodium, mg/L	33			
Sulfate, mg/L	28			
Specific Conductance, umhos/cm	810			
Filterable Residue, mg/L	760			
Zinc, mg/L	<0.018			
Nitrate (as NO3), mg/L	7.5			
Nitric Acid Digestion, Date	01/29/85			
Chemical Oxygen Demand, mg/L	<3.0			

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	7.5	0.1	Hydroxide Alk (as CaCO3)	0.0
Chloride	17	0.5	Carbonate Alk (as CaCO3)	0
Sulfate	28	0.6	Bicarbonate Alk(as CaCO3)	367
Bicarbonate (as CaCO3)	450	7.3	Ca Hardness (as CaCO3)	187
Carbonate Alk (as CaCO3)	0.0	0.0	Mg Hardness (as CaCO3)	115
			Total Hardness	302
Total Millequivalents per Liter		8.5	Iron	<0.13
			Manganese	<0.04
Cations	mg/L	meq/L	Copper	<0.14
			Zinc	<0.018
Sodium	33	1.4	Surfactants	<0.10
Potassium	5.0	0.1	Filterable Residue	760
Calcium (EDTA Titration)	75	3.7	Sp. Conductance, umhos/cm	810
Magnesium	28	2.3	pH, units	7.2
Total Millequivalents per Liter		7.6		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

GENERAL MINERAL ANALYSIS*

[illegible] LDWELL
[illegible] EERS
[illegible] DIVISION
[illegible] OAKS AVE.
[illegible] 105
[illegible] 7553

Log No. P84-11-118-1

Date Sampled 11/08/84
Date Received 11/08/84
Date Reported 12/06/84

[illegible]Roy Crandall
[illegible] N. Alvarado Street
[illegible] CA [illegible]6

Attn. [illegible] Campbell

Laboratory Director

Sample Description [illegible] Well #1

Anions	Milligrams per liter	Milliequiv. per liter
[illegible]	[illegible]	[illegible].24
[illegible]	[illegible]	[illegible]63
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Total Milliequivalents per liter		[illegible]

Cations	Milligrams per liter	Milliequiv. per liter
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]5	4.[illegible]
Magnesium	[illegible]	[illegible]
Total Milliequivalents per liter		[illegible]

Determination	Milligrams per liter	Determination	Milligrams per liter
Hydroxide Alkalinity (as $CaCO_3$)	0.0		
Carbonate Alkalinity (as $CaCO_3$)	0.0		
Bicarbonate Alkalinity (as $CaCO_3$)	250		
Calcium Hardness (as $CaCO_3$)	240		
Magnesium Hardness (as $CaCO_3$)	60		
Total Hardness (as $CaCO_3$)	300		
Iron	< 0.059		
Manganese	< 0.032		
Copper	< 0.06		
Zinc	< 0.013		
Foaming Agents (MBAS)	< 0.10		
Dissolved Residue, Evaporated @ 180°C	~~140,000~~[a] 400		
Specific Conductance, micromhos @ 25°C	830	pH	7.8

[illegible]

[illegible] checked and found to be true

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

RECEIVED
LAW ENVIRONMENTAL, INC.
NOV 4 1987
File..................................

November 2, 1987

Mr. George Cosby
Cal Mat Company
3200 San Fernando Road
Los Angeles, California 90065

APPROVAL OF HEWITT LANDFILL SWAT PROPOSAL (FILE NO. 58-191)

We have reviewed your letter, dated September 25, 2987, in reply to our comments concerning the Hewitt Landfill SWAT Proposal.

Your SWAT Proposal for Hewitt Landfill is approved. Your final SWAT Report is due to this Board no later than July 1, 1988, although some monitoring data may have to be submitted later.

If you have any further questions, please call Myra Hart at (213) 620-2385.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

RKD:MLH

cc: Jim Parsons, State Water Resource Control Board, Division of Water Quality
Glenn A. Brown, Law Environmental, Inc.

GEORGE DEUKMEJIAN, *Governor*

STATE OF CALIFORNIA

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION

SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012–4596
(213) 620-4460

September 8, 1987

Mr. George Cosby
CalMat Company
3200 San Fernando Road
Los Angeles, California 90065

SWAT PROPOSAL - HEWITT LANDFILL (File No. 58-191)

After reviewing your SWAT Proposal for the subject site, a meeting was held on July 16, 1987, with representatives of LeRoy Crandall and Associates in which we addressed the following deficiencies in the SWAT Proposal:

1. Existing well construction appears to be inadequate for SWAT ground water monitoring. The long perforated well screen lengths may not provide samples that meet our objectives of achieving a more depth-specific ground water analysis and ensuring minimal dilution of contaminants within the well casing. Please provide a ground water monitoring system which will meet our objectives.

2. Well number 3810C, the southernmost proposed downgradient well, is inadequate for SWAT ground water monitoring because sufficient well construction data is not presented. We require that the wells be positioned as close as possible to the compliance points of the landfill in order to ensure immediate detection of contaminants leaving the waste management unit. Please provide us with an additional downgradient well location. The best location appears to be along Laurel Canyon Boulevard at the northeast corner of the landfill.

3. In addition, please provide detailed drawings and data of the proposed well construction and location.

RECEIVED
LeRoy Crandall and Associates

SEP 10 1987

File: E87057
GAB ☑ ☐
☐ ☐

Please submit comments and/or data concerning the above items to this office by September 30, 1987, in order that we may complete the review and approval process for your SWAT Proposal.

If you have any question, please contact Myra Hart at (213) 620-2385.

Dennis Dasker

for RAYMOND K. DELACOURT
Senior Water Resource
Control Engineer

RKD:MLH

cc: Glenn A. Brown, LeRoy Crandall and Associates
Bob Ford, State Water Resource Control Board, Division of Water Quality

September 25, 1987

Cal Mat Company
3200 San Fernando Road
Los Angeles, California 90065

(Our No. 58-7057)

Attention: Mr. George Cosby

Dear Mr. Cosby:

Responses to RWQCB Comments
SWAT Proposal
Hewitt Landfill
(File No. 58-191)

This letter presents our responses to the Regional Water Quality Control Board letter of September 8, 1987.

Comment: #1 - Adequacy of Exiting Wells

Response: The technical justification for having long screens is that the historic change in water levels at the site is about 200 feet. The aquifer is unconfined and has no locally extensive horizontal sublayers. So far, in this aquifer, we see little difference in monitoring results whether we pump wells or bail them, whether they have long or short screens, whether the screen goes above or is entirely below the water table. We have no convincing evidence that dilution occurs in pumped samples, or that devolatilization occurs in bailed samples. However, the existing wells can be modified to provide more depth specific water samples and reduce the chance of dilution of contaminants.

Figure 1 shows a proposed modification of the existing wells to meet these requirements. The wells would be fitted with a packer-pump combination intended to block flow from the lower part of the casing. This would produce the effect of a partially penetrating well in an unconfined aquifer. This is intended to meet the RWQCB requirement of sampling the uppermost aquifer.

For partially penetrating wells in unconfined aquifers, most of the water produced by the well comes from the sides of the cone of depression where the gradient is steepest. Note that any partially penetrating well, there is some upconing of water from beneath the end of the screen, so merely drilling a short well does not ensure that all water pumped comes from an area above the base of the well. (See Ground Water and Wells, pages 211 and 249.) Hydraulically, the packer-shortened well will behave the same as a truly short well. We do not anticipate any observable water quality changes whether the packer is in place or not.

Comment: #2 - Additional Downgradient Well

Response: The attached Figure 2 shows the proposed location of a new downgradient well. We believe a site a little south of the corner of the site will cover a wider area of the landfill, and ensure that the well is always downgradient of refuse.

Comment: #3 - Well Construction Details

Response: Figure 3 shows details of construction for the required new well, including the packer-pump assembly.

If you have any questions, please contact either Glenn Brown or Alice Campbell at (818) 848-0214, which is our new telephone number.

Yours very truly,

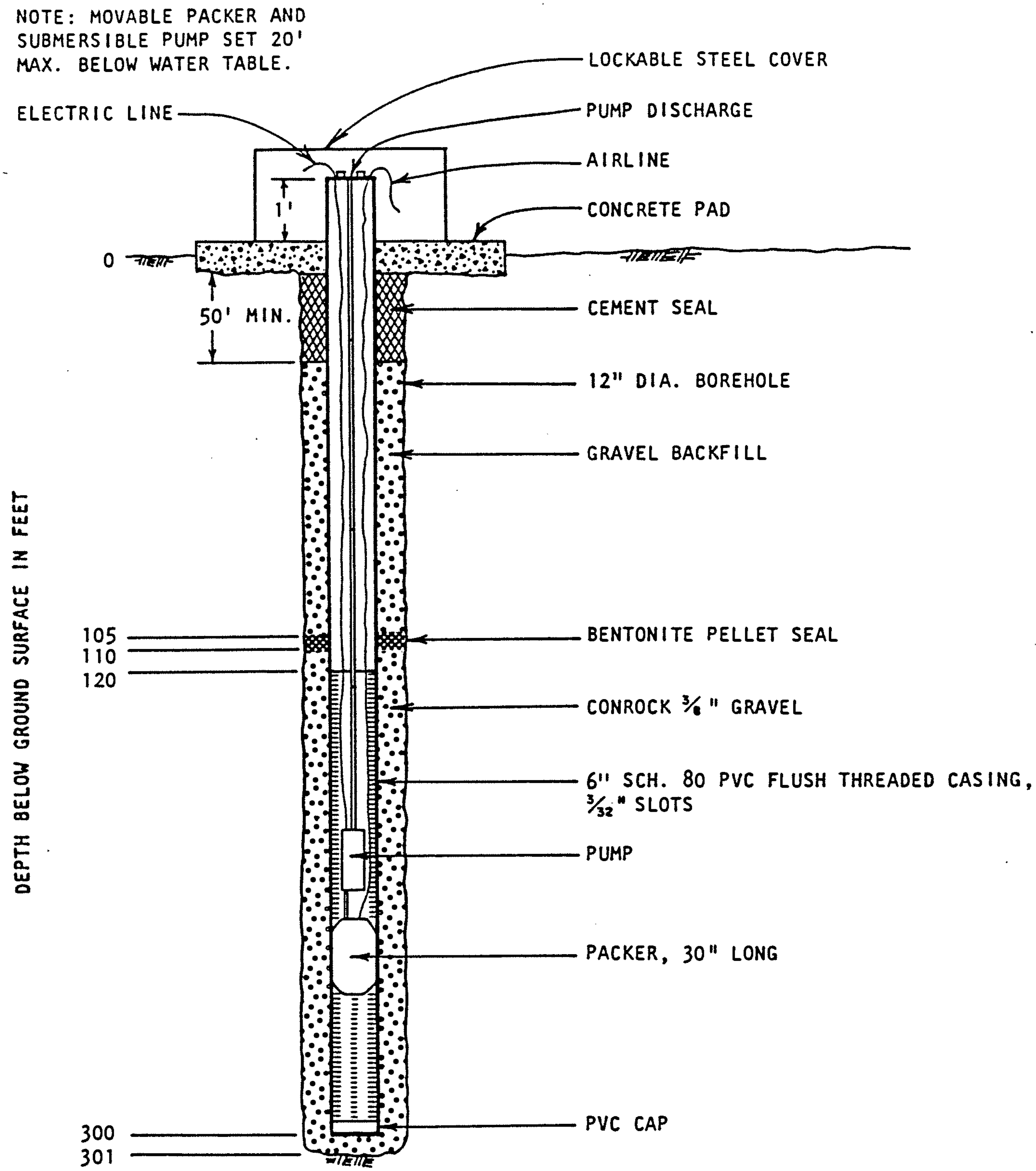
LAW ENVIRONMENTAL, INC.

by Alice Campbell

Alice Campbell C.E.G. 1157

by Glenn A Brown

Glenn A. Brown C.E.G. 3



HEWITT LANDFILL

PROPOSED MONITORING WELL

CONSTRUCTION DETAILS

NOT TO SCALE

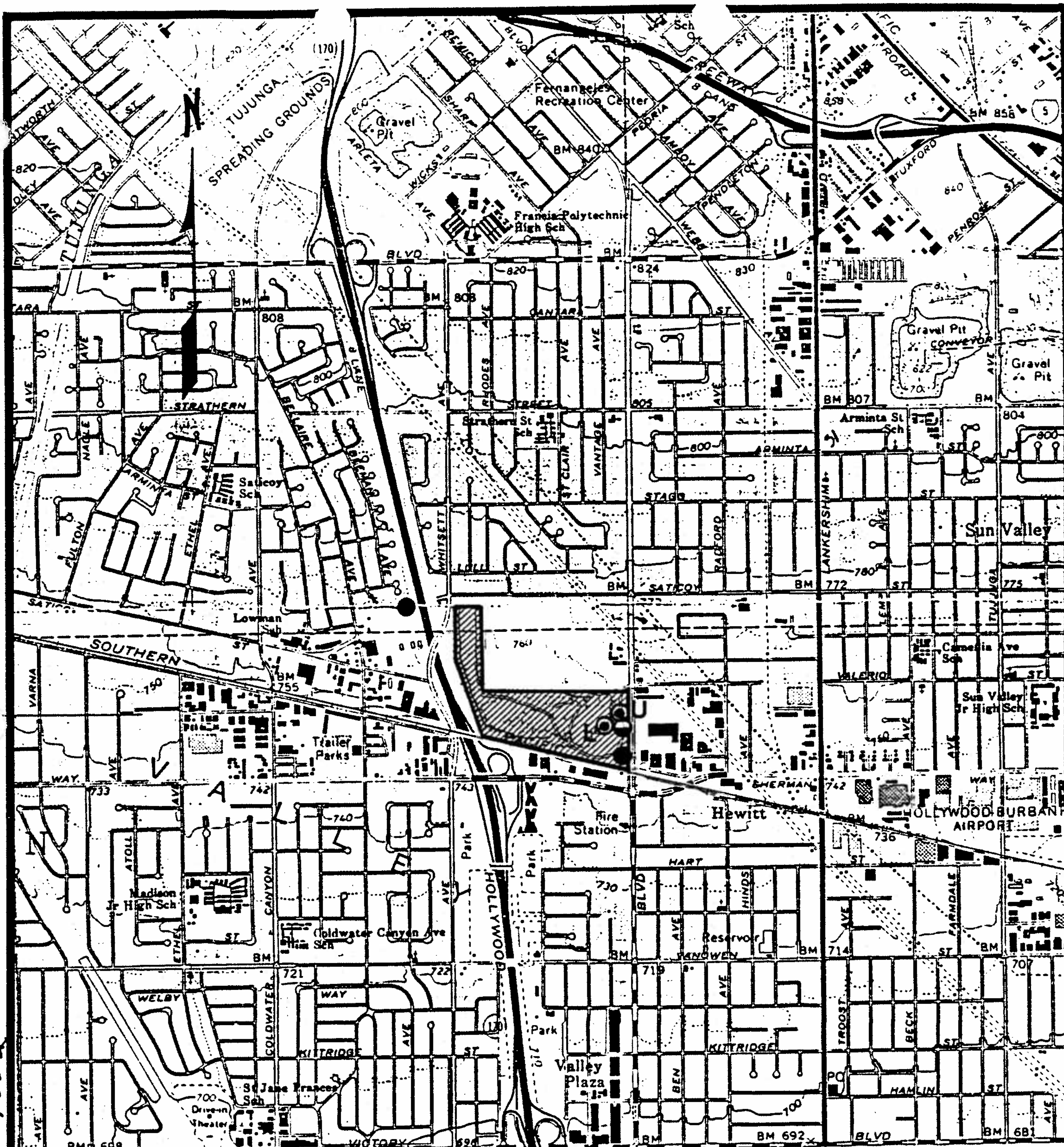
LeROY CRANDALL AND ASSOCIATES

FIGURE 1

JOB E87057 DATE 09-17-87 DR. MA G. AC W.P. ____ CHKD. ____

58-7057

FORM 12



EXPLANATION:

- ● MONITORING WELL
- U◉ LYSIMETER
- L◉ LEACHATE TEST HOLE
- ◓ NEW DOWNGRADIENT WELL

REFERENCE:
BASE MAP FROM U.S. GEOLOGICAL SURVEY 7½ MINUTE VAN NUYS QUADRANGLE, 1972.

0 1000 2000
SCALE IN FEET

LOCATION OF MONITORING POINTS
HEWITT LANDFILL

LeROY CRANDALL AND ASSOCIATES

JOB E-87057 58-7057 DATE 09-21-87 DR. MA O.E. AC W.P. ____ CHKD ____

FORM 120

FIGURE 2

SOLID WASTE ASSESSMENT TEST REPORT - WATER

HEWITT LANDFILL

NORTH HOLLYWOOD DISTRICT, LOS ANGELES, CALIFORNIA

FOR

CALMAT COMPANY

PROJECT NO. 58-7057

June 6, 1988

CalMat Properties
3200 San Fernando Road
Los Angeles, California 90065

Project No. 58-7057

Attention: Mr. George Cosby

Gentlemen:

SWAT REPORT FOR HEWITT LANDFILL (CLOSED)
North Hollywood District
City of Los Angeles, California

In accordance with our discussions, we are submitting this Solid Waste Assessment Test - Water for the Hewitt Landfill. This report includes results of site exploration, our interpretation of the data, and our conclusions concerning existing conditions at the site.

If you have any questions, please don't hesitate to call us.

Yours very truly,

LAW ENVIRONMENTAL, INC.

by Steve McArdle
Steve McArdle
Staff Geologist

by Glenn A. Brown
Glenn A. Brown, C.E.G. 3
Senior Vice President

SM/pd
(6 copies submitted)

cc: (2) RWQCB

TABLE OF CONTENTS

TABLES

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SOLID WASTE ASSESSMENT TEST REPORT - WATER

HEWITT LANDFILL

NORTH HOLLYWOOD DISTRICT, LOS ANGELES, CALIFORNIA

FOR

CALMAT COMPANY

PROJECT NO. 58-7057

SCOPE

This report presents the Solid Waste Water Quality Assessment Test - Water (SWAT) for the Hewitt Landfill. This report includes the results of the vadose zone and ground water monitoring program as required by Assembly Bill No. 3525 (Calderon Act). Because there has not been a full year of monitoring since the SWAT proposal was approved (before the SWAT report deadline), we will continue quarterly sampling for the remainder of 1988 and for one quarter in 1989. Submitted with this report are the results of the April, 1988 monitoring.

This program was approved by the Regional Water Quality Control Board (RWQCB) on November 2, 1987. It has been prepared in accordance with the SWAT proposal and related correspondence for the site. The SWAT proposal (our Project No. 58-7057), which was submitted on March 31, 1987 is in the RWQCB file. Related correspondence are included in Appendix A of this report. Site information is included in the SWAT proposal. This report has also been prepared in accordance with the Solid Waste Assessment Test Guidance document prepared by State Water Resources Control Board dated October 1986.

The additional monitoring work performed thus far for this SWAT program include:

1) Construction of one downgradient monitoring well
2) Collection and analysis of ground water samples from three monitoring wells, which were obtained during the month of April 1988. A pump with an inflatable packer was employed to insure depth specific samples. Analyses are included in Appendix B.

3) Construction and installation of two lysimeters for vadose zone monitoring.

4) Construction and installation of one leachate well.

For this study we obtained data for wells within a one-mile radius of the site. We also determined the ownership of the wells, the depth of presently existing wells in the vicinity of the landfill, and available background water quality data.

Our study included review of well data at the Los Angeles County Flood Control District office, and a review of published data from the California Department of Water Resources and the California Regional Water Quality Control Board. This report is based on available information from site records, operators, and agency files. No warranty as to the completeness or accuracy of these accounts is made.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

SITE CHARACTERISTICS

The Hewitt Landfill is located at 7361 Laurel Canyon Boulevard, North Hollywood District, City of Los Angeles, California. The site is owned by CalMat Company, but the landfill was operated by Los Angeles By-Products Company. The site is located in Section 1, Township 1N, Range 15W, in Section 36, Township 2N, Range 15W. The site is shown on Plate 1, Local Geology and Well Location Map. The site has not received refuse since its closure in 1975; the land is currently used for Cal-Mat Self-Storage and for an auto, recreational vehicle, and boat storage yard business.

EFFECT OF SITE ON GROUND WATER

Only non-hazardous solid waste and inert waste were permitted in the landfill. No liquid or hazardous wastes were accepted. Decomposition of non-hazardous solid wastes in landfills produces gas and, where water is present, leachate is also produced. Leachate is liquid that has percolated through solid waste and has extracted, dissolved or suspended material from it.

Ground water would be affected if leachate reaches it; ground water or surface water in contact with non-hazardous solid wastes would facilitate production of leachate. Water quality could also be affected by landfill gas in contact with ground water.

In general, the more water flowing through non-hazardous solid wastes in a landfill, the greater the amount of pollutants that will be leached. However, concentration of leachate depends on dilution and solubility of the waste materials, and decreases with time. There is no indication that any appreciable amount of water has infiltrated the landfill to generate leachate. Rainfall is low, drainage is controlled, and soil used for landfill cover is fine grained and relatively impermeable. Since the Waste Discharge Requirements stated that nonwater soluble non-decomposable inert waste be deposited below elevation 655 and that decomposable commercial residential refuse be deposited above that elevation, the site was designed to prevent possible inundation of decomposable waste by ground water. Because the San Fernando Valley is an adjudicated basin, the water demand is expected to continue at current or higher levels, eliminating any potential threat of ground water inundation. Drilling in the refuse indicated that it was dry to moist, and that no free water was present in isolated pockets or lenses perched above the water table. See Appendix E for results of refuse moisture content sampling.

Leachate characteristics at landfills vary widely and no general method has been developed to predict the exact composition which may be produced in a particular fill. In general, leachate in ground water would be expected to increase chloride and other minerals, TDS, COD and alkalinity.

Decomposition of non-hazardous solid wastes in the landfill produces gas that is chiefly methane and carbon dioxide. Methane is generally of little influence on ground water quality. The landfill has an extensive gas recovery system. In general, gas in contact with ground water would cause increase in CO_2, hardness, soluble gases, odor, and create an anaerobic environment. Anaerobic bacteria consume nitrate and sulfate that may be present in ground water. The Air Quality SWAT is being done by others. Analyses of landfill gas are present in Appendix C. The analytical results are discussed later in this report.

TOPOGRAPHY AND DRAINAGE

Generally, the natural ground slopes about two percent to the south, but drainage has been altered locally by road building. The topography at the landfill is shown at a scale of 1" = 1000' on Plate 1, Local Geology and Well Location Map. Table 1, Water Wells, lists wells located within one mile of the site and available well information.

Natural drainage direction in the area is to the south; however, no runoff enters the landfill from off-site or leaves the site, so that only rain that falls on the site can percolate. Much of the soil used for cover was fine-grained with a relatively low permeability. Additionally, a large portion of the site is paved with asphalt. Therefore, due to lower permeability soils and asphalt, much of the water from precipitation leaves the site by evaporation.

Table 1
WATER WELLS

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3780	225	16	16	?	?	?		None	?	No	No	?
3780A	597	20	20	?	?	City of Los Angeles	1929	None	?	Yes	No	City of L.A.
3780B	145	3/4	?	?	?	?	1929	None-capped	?	No	No	?
3780C	787	?	?	?	?	L.A. Dept. of Water & Power	1963	Municipal Supply	?	Yes	No	L.A. DWP
3790	375	20	20	?	?	?	1924	Destroyed 1959	?	Yes	No	?
3790A	546	20	20	?	?	City of Los Angeles	1929	Destroyed 1959	?	?	No	City of L.A.
3790B	467	?	?	?	?	City of Los Angeles	1931	Municipal Supply	?	?	No	City of L.A.
3790C	494	20	20	?	166 - 178 200 - 225 250 - 266 274 - 304 308 - 366 421 - 460	E.A. Buss	1948	?	?	Yes	No	?
3790D	481	20	20	?	222 - 298 367 - 298 432 - 460	L.A. Dept. of Water & Power	1951	Municipal Supply	?	Yes	No	L.A. DWP
3790E	596	20	20	?	220 - 262 275 - 370 418 - 452	Fred Aleanter	1959	Municipal Supply	?	Yes	No	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3790F	570	20	20 Tool	Cable 198 - 340 348 - 376 412 - 445 465 - 540	160 - 187	L.A. Dept. of Water & Power Municipal Supply	1958	L.A. Dept. Water & Power	?	Yes	Yes	L. A. DWP
3790G	760	20	20	?	?	L.A. Dept. of Water & Power	1964	None Capped 4-64	?	Yes	?	L. A. DWP
3790H	802	20	20	?	265 - 370 432 - 462 502 - 648 700 - 720	L.A. Dept. of Water & Power	1967	?	?	Yes	?	L. A. DWP
3790J	No Information										Yes	?
3791	91	8	8	No Information							Yes	?
3791A	No Information							Destroyed 1950	No Information			?
3791B	No Information							Destroyed 1950	No Information			?
3800	393	20	20	?	105 - 135 172 - 276 282 - 309 318 - 374	So. California Drilling Co.	1924	Domestic & Irrigation	?	No	No	?
3800A	583	16	16	?	160 - 535	F.E. Griswold	1924	Municipal Supply	?	No	No	?
3801	109	7	7	?	?	?	Prior to 1947	Abandoned	?	No	No	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3810	495	20	20	?	?	?	Prior to 1924	Municipal Supply	?	Yes	No	?
3810A	465	?	?	?	110 - 225 245 - 302 327 - 392	?	?	Municipal Supply	?	Yes	No	?
3810B	419	?	?	?	120 - 149 155 - 181 185 - 214 220 - 265 320 - 387	H.E. Bredehoft	1947	Municipal Supply	?	Yes	No	?
3810C	No Information											?
3810D	No Information											?
3810E	No Information							Destroyed 7/50				?
3810G	150	20	20	?	?	?	?	Casing Sealed 4/66	?	No	No	?
3810H	350	12	12	?	?	?	?	Capped 7/66	?	No	No	?
3810J	150	20	20	?	80 - 150	M.R. Peck & Sons	1957	None - Sealed 4/66	?	Yes	No	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3810K	812	20	20	Cable Tool	250 - 258 292 - 392 535 - 603 631 - 660 710 - 760	L.A. Dept. of Water & Power	1962	Municipal Supply	?	Yes	No	L.A. DWP
3810L	714	20	20	?	?	L.A. Dept. of Water & Power	?	Municipal Supply	?	Yes	No	L.A. DWP
3810M	822	20	20	Cable Tool	300 - 395 435 - 443 475 - 510 565 - 625 650 - 692 736 - 795	L.A. Dept. of Water & Power	1968	Municipal Supply	?	Yes	Yes	L.A. DWP
3810N	855	20	20	Cable Tool	300 - 305 333 - 395 423 - 484 490 - 515 550 - 620	L.A. Dept. of Water & Power	1969	Municipal Supply	?	Yes	Yes	L.A. DWP
3810P	865	20	20	Cable Tool	308 - 323 328 - 407 418 - 425 435 - 448 514 - 575	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	Yes	L.A. DWP
3810Q	640	20	20	Cable Tool	248 - 275 280 - 346 358 - 400 420 - 454 480 - 520	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	Yes	L.A. DWP

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3810R	738	20	20	Cable Tool	280 - 406 448 - 460 494 - 497 503 - 522 533 - 538	L.A. Dept. of Water & Power	1970	Municipal Supply	?	Yes	No	L.A. DWP
3810S	414	20	20	?	110 - 142 162 - 221 245 - 288 297 - 391	So. Calif. Drilling Company	1924	Municipal Supply	?	Yes	No	?
3810T	687	20	20	?	205 - 222 250 - 280 327 - 389 405 - 413 422 - 433	L.A. Dept. of Water & Power	1963	Municipal Supply	?	Yes	No	L.A. DWP
3800C	555	20	20	?	206 - 246 260 - 283 318 - 338 338 - 410 464 - 508 514 - 534	H.E. Bredehoft	1954	Municipal Supply	?	Yes	No	?
3800D	770	20	20	?	255 - 275 318 - 396 573 - 583 645 - 676	L.A. Water District	1962	?	?	Yes	No	L. A. Water District
3811	90	?	?	?	?	C.E. Tomson	1916	Destroyed 7/50	?	No	No	?
3811A	96	?	?	?	?	?		Destroyed 3/50	?	No	No	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3811B	?	7	7	No Information								?
3811C	?	12	12	?	?	?	?	Capped 4/59	?	No	No	?
3811D	No Information							Destroyed 1924	No Information			?
3811E	248	8	8	?	110 - 147 168 - 178 182 - 226	Elmer A. Buss	1945	Observation	?	Yes	No	?
3811F	632	20	20	?	204 - 214 270 - 313 365 - 380 425 - 446 447 - 491 522 - 542 555 - 600	C.A. Tomson H.E. Bredehoft	1953	Municipal Supply	?	Yes	No	?
3811G	601	20	20	?	190 - 227 274 - 319 344 - 352 360 - 367 407 - 427 445 - 461 543 - 549	C.A. Tomson H.E. Bredehoft	1953	Municipal Supply	?	Yes	No	?
3820	?	?	?	?	?	C.A. Tomson Supply	?	Municipal	?	No	No	?
3820A	?	?	?	?	?	?	1915	Destroyed 7/50	?	No	No	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
3820B	No Information						1930	Municipal Supply	No Information			?
3820C	No Information					L.A. Water Department	1930	Municipal Supply	No Information			L. A. Water Dept.
3820D	No Information					L.A. Water Department	1930	Municipal Supply	No Information			L. A. Water Dept.
3820E	512	20	20	?	150 - 175 185 - 204 232 - 274 284 - 369 501 - 509	L.A. Water Department	1951	Municipal Supply	?	Yes	No	L. A. Water Dept.
3820F	780	20	20	?	?	L.A. Water Department	1959	Municipal Supply	?	Yes	No	L. A. Water Dept.
3820G	No Information											?
4895B	No Information											?
4897	450	20	?			L.A. Dept. of Water & Power	1932	Monitoring	?	Yes	Yes	L. A.
4897A	370	8	8	?	60 - 75 90 - 105 130 - 145 180 - 370	L.A. Dept. of Water & Power	1963	Ground Water Observation	?	Yes	Yes	?
4889	148	?	?	?	?	C.E. Tomson	1916	?	?	Yes	No	?
4898	363	20	20	?	250 - 330	L.A. Dept. of Water & Power	1974	?	?	Yes	Yes	?

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
4919	197	12	12	?	?	?	?	None - Destroyed or Collapsed Casing		No	No	?
4919A	128	?	?	?	?	?	1934	Domestic	?	No	No	?
4919B	156	6	?	Excavated		A.R. Tomson	1948	Observation	?	No	No	?
4919D			No Information									?
4929	731	20	20	?	200 - 214 264 - 217 350 - 473 487 - 502 562 - 572 586 - 638 658 - 714	C.A. Tomson	1983	None Capped	?	Yes	Yes	?
4909	No Information							None - Destroyed 11/24/50	?			?
4909A	254	16	16	?	?	So. Calif. Drilling Co.	1924	Destroyed 1944	?	Yes	No	?
4909B	326	16	16	?	230 - 270 300 - 314	Saunders Bros.	1952	Sand & Gravel Washing	?	Yes	No	?
4918	365	9	9	Rotary	164 - 365	Howard Pump	1984	Monitor	0 - 156	Yes	Yes	L.A. By Products
4918A	500'	6	6	Rotary	230 - 240 300 - 310 390 - 410 480 - 490			Monitoring	?	Yes	Yes	DWP

Table 1
WATER WELLS
(continued)

Well No.	Depth (ft)	Top Diam. (in)	Bottom Diam. (in)	Drilling Method	Interval Perforated Depth (ft)	Drilling Contractor	Year Drilled	Well Use	Seal Depth (ft)	Log Existence	W.Q.* Analysis Available	Owner
4899	290	12 1/2	12 1/2	Rotary	120 - 280	Howard Pump	1984	Monitoring	0 - 110	Yes	Yes	CalMat
4918A	500	6	6	Rotary	230 - 240 300 - 310	Cofferdam Unwatering	1985	Monitor	?	Yes	Yes	L.A. DWP
4927	375	8	8	Rotary	175 - 375	Howard Pump	1984	Monitoring	0 - 145	Yes	Yes	L.A. By Products
4928A	452	8	8	Rotary	224 - 433	Howard Pump	1984	Monitoring	0 - 100	Yes	Yes	L.A. By Products
4928B	362	8	8	Rotary	161 - 362	Howard Pump	1984	Monitoring	0 - 138	Yes	Yes	L.A. By Products
Penrose #5	370	8	8	Rotary	160 - 369	Howard Pump	1988	Monitoring	0 - 35 145 - 150	Yes	Yes	L.A. By Products
Tuxford #6	359	8	8	Rotary	160 - 358	Howard Pump	1988	Monitoring	0 - 50 145 - 150	Yes	Yes	L.A. By Products
Tuxford #7	379	8	8	Rotary	160 - 375	Howard Pump	1988	Monitoring	0 - 40 145 - 150	Yes	Yes	L.A. By Products
Newberry #8	377	8	8	Rotary	160 - 375	Howard Pump	1988	Monitoring	0 - 40 145 - 150	Yes	Yes	L.A. By Products
4909C	500	6	6	?	230 - 240 290 - 300 390 - 400 480 - 490	?	1984	Monitoring	?	Yes	Yes	L.A. DWP
Second Downgradient Hewitt	348	8	8	Rotary	138 - 348	Howard Pump	1987	Monitoring	0 - 123	Yes	Yes	CalMat

GEOLOGY

GENERAL

The site is located in the northeast quarter of the San Fernando Valley Basin. The San Fernando Valley is an elliptical alluvium-filled extensional basin, approximately 23 miles long and 12 miles wide. Alluvium has been deposited from streams and rivers that have carried erosional debris from surrounding upland areas. The valley is an extensional basin within the Transverse Ranges Geomorphic Province. This valley has several hydrogeologic subareas based on physiographic and geologic features. The site is located within the San Fernando Subarea, which is subjacent to all the other subareas, and receives surface drainage from each of them.

The San Fernando Subarea is separated from the other subareas by folds and faults, alluvial constrictions, or man-made works. All but 9% of the Upper Los Angeles River Ground Water Basin is included in the subarea. The San Fernando Subarea is divided into eastern and western units based on grain size. The valley alluvium of the western portion is fine grained material that transmits water at relatively slow rates. It is derived from surrounding sedimentary rock, whereas the valley alluvium from the eastern portion is coarser grained material that transmits water at relatively higher rates. The coarser grained material is eroded from granitic basement complex of the San Gabriel and Verdugo Mountains. The site is located in the coarse grained eastern portion of the Valley.

The alluvium filling the San Fernando Subarea is Pleistocene and Holocene age. The material was transported and deposited by Tujunga Wash. The alluvium covers Upper Miocene age Modelo Formation and the middle Miocene Topanga Formation. These Miocene sedimentary rocks in turn cover the pre-Cretaceous age crystalline and metamorphic basement complex rocks. Plate 2, Regional Geology, shows general geology over a wide area surrounding the site.

GEOLOGIC MATERIALS

The geologic units found in the eastern San Fernando Subarea are, from youngest to oldest: 1) Holocene alluvium, 2) upper Pleistocene (older) alluvium, 3) Miocene sedimentary formations, and 4) pre-Cretaceous crystalline and metamorphic rocks. The geologic units are described briefly as follows:

Holocene Alluvium

The Holocene alluvial deposits of the eastern San Fernando Subarea consist of poorly bedded alluvial fan deposits left by washes draining Tujunga and La Tuna Canyons. The alluvial fan deposits are mainly accumulations of light grey subangular boulders, gravels, and sands. Typical alluvial fan deposits are coarsest near the canyon mouths and become finer farther away. The deposits are uncemented, but are so tightly packed that they stand at 1:1 or steeper slopes. The Holocene deposits are approximately 75 to 100 feet thick. These deposits are highly permeable, but are high above the water table and do not hold significant amounts of water.

Upper Pleistocene (Older) Alluvium

The older alluvium is also made of alluvial fan sediments left by older streams having nearly the same source areas as the present streams. Like the Holocene alluvium, these deposits are also crudely horizontally stratified. There is no associated change in materials at the transition between the Holocene deposits and the Pleistocene alluvium. The stratification is based on a slight color change between the light grey upper sediments and the light orange-brown to reddish-grey older sediments.

The Pleistocene deposits consist of brownish to orange-grey silty, subangular sand, cobbles and boulders. The rock types are similar to the younger materials, so the regional topography and drainage were probably similar during the respective depositional periods. The environment of deposition, as indicated by grain size distribution and bedding, does not change through the sequence. The only difference between the Holocene and Pleistocene alluvium seems to be a difference in the amount of weathering.

Miocene Sedimentary Rocks

The Miocene sedimentary rocks include the middle Miocene Toganga Formation and the upper Miocene Modelo Formation. Both formations consist of marine shales, siltstones, sandstones and some conglomerates. The Topanga Formation also contains volcanic flows and breccias. Some of these older sediments make up the west abutment of Hansen Dam, located 4 miles to the north-northeast. The Miocene Formations are present deep beneath Hansen Dam, in the Shadow Hills area to the northeast (Read, 1943), and in the Pacoima Hills. These rocks are not used for water supply in the San Fernando Valley, and were not considered part of the waterbearing sequence by the State Water Rights Board (1962).

Basement Complex

Pre-Cretaceous crystalline and metamorphic rocks occur beneath all the waterbearing deposits of the basin are called the basement complex. These rocks are mostly granitic rocks with intrusive dikes which were locally metamorphosed to schists and gneisses. They form the main mass of the San Gabriel Range to the north and Verdugo Mountains to the east.

Although these rocks are poor aquifers, they are recharge areas. They have about one percent primary porosity, but are fractured, weathered and jointed. This secondary porosity allows the basement rocks to act as limited recharge areas where exposed to rainfall in the hill and mountain areas.

GEOLOGIC STRUCTURE

The geologic structure near and beneath the site includes bedding, unconformities, and faults. The Holocene and Pleistocene alluvial fan and stream deposits have crude horizontal stratification with weakly developed bedding. A major unconformity is found at the contact between Pleistocene alluvium and the older granitic and sedimentary rocks. None of the monitoring wells encountered the underlying bedrock.

Nearby faults include the active San Fernando Fault Zone, the potentially active Verdugo Fault and the Northridge Hills Fault. Table 2 gives criteria for fault activity classification. Plate 3, Regional Seismicity, shows major faults and earthquake epicenters in Southern California. Plate 4, Geologic Sections, shows lithology and structural features for sections through the site.

San Fernando Fault Zone (Active)

The nearest Alquist-Priolo Special Studies Zone is along the San Fernando Fault northeast of the site. The Tujunga segment of the fault is 4.3 miles northeast of the site. The latest major activity on the fault was the magnitude 6.4 earthquake of February 9, 1971. The earthquake produced accelerations of about 0.5g at the site, but did no observable damage.

Verdugo Fault (Potentially Active)

The trace of the Verdugo Fault is located approximately 1.8 miles northeast of the site, as shown on Plate 1. The fault forms a barrier to ground water within the Pleistocene deposits. This offsets the water levels north of the fault by over 100 feet. The fault has been mapped on the surface in northeastern Glendale and at scattered locations in Burbank. Although the

TABLE 2
CRITERIA FOR CLASSIFICATION OF FAULTS WITH REGARD TO SEISMIC ACTIVITY
(After D. B. Slemmons, 1979)

Activity Classification and Definition	Criteria: Historic	Criteria: Geologic	Criteria: Seismologic
Active - a tectonic fault with a history of strong earthquakes or surface faulting, or a fault with a short recurrence interval relative to the life of the planned project. The recurrence interval used to define activity rate may vary according to the consequence of activity.	(1) Surface faulting and associated strong earthquakes. (2) Tectonic fault creep or geodetic evidence of fault displacement or deformation.	(1) Geologically young deposits cut by fault. (2) Youthful geomorphological features that are characteristic of geologically young displacements along the fault trace. (3) Ground water barriers in geologically young or unconsolidated deposits.	Earthquake epicenter can be assigned with confidence to the fault.
Potentially Active - a tectonic fault without historic surface offset, but with a recurrence interval that could be sufficiently short to be significant to the particular project.	No reliable report of historic surface faulting.	(1) Geomorphic features that are characteristic of active faults, but with subdued, eroded, and discontinuous form. (2) Faults not known to cut or displace youngest alluvial deposits, but offset older quaternary deposits. (3) Water barriers in older deposits. (4) Geological setting in which the geometry in relation to active or potentially active faults suggests similar degree of activity.	Alignment of some earthquake epicenters along or near fault, but assigned locations have low degree of confidence in location.
Activity Uncertain - a fault with insufficient evidence to define past activity or recurrence interval. The following classifications can be used until the results of additional studies provide definitive evidence.	Available information is insufficient to provide criteria that are sufficiently definitive to establish fault activity. This lack of information may be due to the inactivity of the fault or to lack of investigations needed to provide definitive criteria.		
Tentatively Active - predominant evidence suggests that the fault may be active even though its recurrence interval is very long or poorly defined.	Available information suggests evidence of fault activity, but evidence is not definitive.		
Tentatively Inactive - predominant evidence suggests that fault is not active.	Available information suggests evidence of fault inactivity, but evidence is not definitive.		
Inactive - A fault along which it can be demonstrated that surface faulting has not occurred in the recent past, and that the requirement interval is long enough not to be of significance to the particular project.	No historic activity.	Geomorphic features characteristic of active fault zones are not present and geological evidence is available to indicate that the fault has not moved in the recent past and recurrence is not likely during a time period considered significant to the site. Should indicate age of last movement: Holocene, Pleistocene, Quaternary, Tertiary, etc.	Not recognized as source of earthquakes.

fault cuts Pleistocene sediments, it does not appear to cut Holocene deposits.

There is no evidence that the ground water barrier formed by the Verdugo Fault extends into Holocene deposits of Tujunga Wash. There is no vegetation line or line of springs present on the 1908 USGS map of the vicinity which show predevelopment conditions. There is no topographic evidence of the fault in the alluvium. Based on the Pleistocene shears and the lack of observable Holocene offset, the fault is considered only potentially active and is not included in the state mandated Alquist-Priolo Special Studies Zone.

Northridge Hills Fault (Potentially Active)

The potentially active Northridge Hills Fault is located four and one-half miles to the northwest of the site and is shown on Plate 2, Regional Geology. Its location is primarily based upon numerous oil test holes that have been drilled in the Northridge Hills. Logs of these wells indicate that the Modelo Formation has been displaced between 500 and 1000 feet along the dip of the fault. The apparent movement along the fault has been dip-slip with the north block moving up. Sparse information indicates that it is a barrier to the movement of ground water in the Pleistocene age fill west of Sepulveda Boulevard. The fault has no known effect east of Sepulveda Boulevard.

LAND AND WATER USE

The location of monitoring and water wells within about one mile of the site are shown on Plate 1, Local Geology and Well Location Map. There are no known oil or geothermal wells within one mile of the site. The names, owners and addresses (where known) of wells are listed on Table 1. The ownership and location of the wells were determined from well data at the Los Angeles County Flood Control District, Los Angeles Department of Water and Power, and review of published data from the California Regional Water Quality Control Board, and California Department of Water Resources.

The land use within one mile of the site is a mixture of agriculture, residential, and industrial-commercial. A residential tract is located along the east side of the northerly trending finger of the landfill, and along the west half of the north side of the main body of the landfill. Row crops have been grown along the north side of the landfill between the residential area and the small light industrial area along Laurel Canyon Blvd. We understand that this area will no longer be used for agricultural purposes, but will soon be developed for residential use. Bordering the south side of the landfill is the Southern Pacific Railroad Tracks. Laurel Canyon Boulevard borders the east side of the site, and the west side is bordered by light industrial. Plate 5, Land Use Map shows land use within one mile of the site.

Ground water in the vicinity of the site is used for municipal purposes. Because the San Fernando Valley is an adjudicated basin and water rights have been apportioned, future uses will be limited to shifting present uses. Some wells in the vicinity of the site have experienced contamination problems that do not appear related to the site. Compared with past experiences at the Sheldon Area Landfill, where contamination was found a mile downgradient, there are no reported landfill related problems with LADWP's supply wells 2000 feet downgradient.

WASTE CHARACTERISTICS

The site was open to the public for the disposal of waste between 1962 and November 12, 1975. The type of waste that was disposed of below elevations 555 to 560 was limited to solid inert materials. Waste disposed of above 555 to 560 ft. elevations consisted of solid commercial and residential waste and nonwater soluble, nondecomposable inert solid waste. This material consisted of some of the items below:

glass	manufactured rubber products
paper and paper products	market refuse
cloth and clothing	street sweepings
wood and wood products	garbage
lawn clippings, shrubbery	plaster

Although the site did not accept toxic material such as insecticides, poisons, or radioactive waste, some household waste items may have contained minor amounts of hazardous materials. Because of the manner and containers in which it was received, it would have been impossible to reject all of it. The potential amount of household waste containing hazardous compounds is small compared to the overall amount of waste received. The following list includes some of the items normally associated with household refuses:

pesticides	dry cell batteries
varnish	nail polish
dyes	paint
medicine	ink
crankcase oils	various spray cans containing chemicals

Hewitt Landfill also received soil for daily cover of trash. It is estimated that soil used for cover constitutes 10 to 15 percent of the refuse volume.

HYDROLOGY

WATER-BEARING CHARACTERISTICS OF NATURAL MATERIALS

Most of the ground water within a mile of the site is within the Pleistocene alluvium. The Holocene alluvium is more than 100 feet above the perennial ground water surface. The Holocene alluvium transmits water to the Pleistocene alluvium during recharge events. The Miocene and pre-Cretaceous rocks beneath the alluvium are not used for water supply because they do not contain economically exploitable volumes of water.

Holocene Alluvium

The Holocene alluvium lies above the main waterbearing portion of the alluvium. The Holocene alluvium beneath Tujunga Wash is considered by the State Water Rights Board (p. xxxiii, 1962) to have the highest infiltration capacity in the San Fernando Valley. According to maps of the Los Angeles County Flood Control District, the soil type is 015, Tujunga fine sandy loam. The Los Angeles County Flood Control District uses the nomenclature of the USDA for local soils. CDMG (1980) considers soils of the Tujunga and Hanford series to represent the youngest alluvium in the valley.

Pleistocene Alluvium

All of the ground water used in the eastern San Fernando Subarea lies within the Pleistocene alluvium. This unit consists of over 2000 feet of sand, gravel and boulders with red clay lenses. Both alluvial units unconformably overlie the underlying bedrock.

PERMEABILITY TESTING

Permeability of the Pleistocene alluvium was evaluated during construction of Second Downgradient Well. The Holocene sand and gravel in the upper 100 ft. of sediments in the area, are in continuity with the Pleistocene alluvium aquifer.

During well development, a pump test was performed to estimate the transmissivity of the aquifer. The results of the pump test indicates a transmissivity of approximately 240,000 gallons per feet per day. The calculations for the above data are found in Appendix C, Well Completion Report for the second downgradient well.

GROUND WATER MOVEMENT

The movement of ground water in the vicinity of the site is from northwest to southeast. Because the site is not adjacent to the Verdugo Fault, the fault does not affect the flow directions. The Tujunga spreading grounds are located north-northwest of the site and are not directly upgradient of the site. However, under conditions of heavy water spreading, flow gradients in the vicinity of the site are probably affected. Plate 6, Ground Water Contours, Velocity, and Flow Direction, shows details of ground water elevations, velocity and flow direction.

SPRINGS

There are no known springs within a mile of the site or within the site itself. Ground water did occasionally appear in the bottoms of the deeper gravel pits when large amounts of water were spread during the Spring. This water was part of the ground water body, so its quality was the same as that of ground water.

MONITORING WELLS

The following are all the monitoring wells for the site, along with a description of which area each is in the best position to monitor based on the flow directions:

Well	Area Monitored
Well #1	Upgradient
Well #2 (4909C)	Downgradient
Well #3 (Second Downgradient Well)	Downgradient

All wells have had a pump and packer assembly installed for sampling the top 20 feet of the water table. See Plate 7, Retrofit Packer Assembly For New and Existing Wells at Hewitt Landfill, for details.

DEPTH SAMPLING PROCEDURE

Discrete depth sampling was done for Wells 1 and 3 on April 4, 1988, and Well 2 on April 26, 1988.

At the request of the RWQCB the three monitoring wells to be used during the SWAT Program have been provided with a permanent submersible pump and inflatable packer, which allows for the discrete sampling of the upper 20 feet of water surface. A prefabricated shroud and rubber packer was attached beneath the 2 HP pump and 1 inch discharge pipe for each well.

The pump and packer assembly has been set approximately 20 feet below the water level surface, except in the case of Well 2 (4909C). This well has four perforated zones with concrete seals between each zone. The pump was set below the first perforated interval below the water table. During the sampling run it was discovered that the upper zones were not properly developed, as the well was pumped dry. With the permission of the well owner (DWP) the well pump was pulled and the well was redeveloped. The pump was reset in the well a little deeper than before, but not beyond the next perforated interval. The packer was inflated and the well was pumped greater than three volumes without running dry. Details of the packer setting are shown on Table 3. Well Completion Reports are found in Appendix C.

The well sampling starts with inflating the packer with compressed nitrogen to a predetermined pressure. The pump operates with power provided by a portable generator. Each well has three times its volume of water pumped out before samples are taken.

TABLE 3

MONITORING WELL DATA

CONSTRUCTION DETAILS	UPGRADIENT WELL (WELL 1)	4909C (WELL 2)	SECOND DOWNGRADIENT WELL (WELL 3)
Casing Diameter	8"	6"	8"
Total depth (ft)	290	500	348
Casing Material	0-120 Steel 120-290 PVC	0-500 Steel	0-100' Steel (16") 0-348 PVC (8")
Perforated Interval	120-280	230-240 290-300 390-400 480-490	138-348
Filter Material	Pea gravel	Unknown	3/8" Gravel
Depth and Composition of Seals	0-109 Cement 109-110 Bentonite	Unknown	0-100 Cement 100-123 Bentonite
Date Constructed	11/1/84	Unknown	11/25/84
Depth to Top of Packer	267.42	329.00*	269.00
Depth to Water	246.80	248.08	247.88
Dates Samples	1/8/84 2/27/87 4/4/88	2/27/87 4/26/88	4/4/88
Owner	CalMat	DWP	CalMat

* Packer set additional 20 Ft. below first perforated interval beyond water table to insure sample collection. See discussion under depth sampling procedure.

SWAT SUMMARY

BACKGROUND WATER QUALITY

Background water quality was measured by examining the range of concentrations of major and minor ground water constituents. However, because the sampling for the SWAT program has been limited to one sampling run, conclusions are limited until more analyses are done. The second sampling run will be undertaken late June or early July. Water quality results are located in Appendix B. Sampling not under the SWAT Program was done on two prior occasions at the upgradient well, (Well 1) and on one prior occasion at Well 4909C (Well 2). The existing program requires analyses for the following parameters:

Parameters	Units
General Mineral Analysis . . . . (pH, EC, TDS, Cl, Na, NO_3, SO_4, CO_2, HCO_3, Ca, Mg, k)	mg/l
Metals . . . . (As, Ba, Be, Cd, Cr, Co, Pb, Hg, Mo, Ni, Se, Hg, Tb, V, Sb, Al, B, Cu, Fe, Zn)	ug/l
EPA 624, 625 . . . . (plus MEK and acetone)	ug/l
COD, TOX, Oil and Grease	mg/l

Available water quality analyses for the McBride Well (4889) 3,000 feet upgradient, and the Hewitt upgradient well were reviewed and compared with water quality at the downgradient well. LADWP Well 3800C is reported to have good records of VOCs for several years. The McBride Well (4889) is downgradient of Sheldon-Arleta Landfill. The available analyses are attached in Appendix B. Water analyses including VOCs are available for several LADWP supply wells downgradient.

Preliminary review of the local water analyses shows that upgradient water has had high levels of PCE and TCE. These parameters have been present in Well 4909C and the upgradient well during the same sampling run in 1987, but were not present in the May 1988. Some of the parameters are higher upgradient and lower downgradient, then reverse in the next sampling run. There is no apparent decrease or increase in hardness attributable to landfill gas at the downgradient wells. This is consistent with an old landfill with declining gas production, particularly at the base of the fill. Plates 8 through 14 show results of concentrations of DCA, PCE, TCE, TDS, HCO_3, NO_3, and Cl listed next to the monitoring well locations.

Inorganics

The inorganic constituents analyzed include pH, EC, NO_3, Na, Cl, COD, Alkalinity, CO_2, and TDS. According to reports by LADWP (1983), RWQCB (1975), and California Department of Water Resources (1969), landfills can affect inorganic water quality. The constituents affected are principally CO_2, TDS, Cl, NO_3, HCO_3, and COD.

The following table shows the mineral quality objectives for the area of the Bradley West Landfill. The information is taken from the RWQCB Basin Plan (1975).

TABLE 4

MINERAL QUALITY OBJECTIVES FOR GROUND WATERS

	Objective (mg/l)			
San Fernando Subunit	TDS	Sulfate	Chloride	Boron
North Hollywood-Burbank Area	600	250	100	1.5

The general mineral quality in the vicinity of landfill is within the RWQCB objectives. According to the RWQCB Water Quality Control Plan Report, "....the major threat to water quality is the gaseous product of decomposition. Carbon dioxide production is significant; the gas can migrate through the (unsaturated) soil and dissolve in the ground water resources... Leachate is generally high in BOD and TDS..."

VOLATILE ORGANICS

Volatile organics are found in the upgradient and downgradient monitoring wells. The upgradient well had PCE levels of 200 mg/l in February 1987 that dropped to 2 mg/l in April 1988. Neither one of the downgradient wells show any traces of PCE or TCE during the April 1988 run. However, Well 4909C has 6 and 71 mg/l of PCE and TCE, respectively, during the February 1987 run. Elevated levels of volatile organics is a basin wide problem, whose source is probably careless disposal of industrial waste.

Table 5, Water Quality Summary, shows measured levels of several parameters tested.

VADOSE ZONE MONITORING

To satisfy SWAT requirements, two TIMCO teflon lysimeters were installed in boreholes that were drilled to 50 and 52 ft., respectively. However, we do not endorse the use of lysimeters in gravel. The location of the lysimeter holes is seen on Plate 1, Local Geology and Well Location Map. The lysimeters were installed upgradient and downgradient of the site to insure background sampling and sampling that will be influenced by the landfill. The lysimeter borehole logs and lysimeter construction details are located in Appendix D.

TABLE 5

WATER QUALITY SUMMARY

WELL	DATE	Cl (mg/l)	TDS (mg/l)	HCO_3 (mg/l)	PCE (mg/l)	TCE (mg/l)	NO_3 (mg/l)
Upgradient (Well)	APR '88	27	320	290	2	<1	21
	FEB '87	16	300	340	200	45	0.6
	NOV '84	3.2	420	300	3	-	15
4909C (Well 2)	APR '88	16	520	520	<1	<1	1.4
	FEB '87	35	450	350	6	71	28
Second Downgradient (Well 3)	APR '88	32	570	510	<1	<1	48

To insure a minimum thickness of one and a half inches around the instrument, silica flower mixed with distilled water was poured around the instrument, and frozen prior to installation. To facilitate sampling due to depth the lysimeter contains a transfer vessel.

Sampling was attempted on May 6, 1988, but failed because of lack of moisture. There may not be enough moisture in the alluvium to ever obtain a sample, because the average moisture content of the alluvium is between 3 and 8 percent. However, we will continue to monitor the lysimeters and will collect samples, if possible. If only a small amount of water is collected by the lysimeters, we will specify analysis on a priority basis. Purgeable priority pollutant analyses (EPA 624) will be done first (chloride, TDS, pH, and one or two metals). If a sufficient quantity of water remains, other parameters will be analyzed.

LEACHATE WELL ANALYSIS

Because the site is unlined and because it does not contain a leachate sump, leachate samples were not obtained. A leachate well that was drilled and constructed through refuse, encountered little decomposable waste in a black silty sand matrix. This material was slightly moist to moist and did not contain any leachate or free liquid of any kind. Data on the moisture content of the trash and matrix is found in Appendix E, along with construction details of the leachate well. The location of the leachate well is on Plate 1, Local Geology and Well Location.

AIR SWAT SUMMARY

As of the date of this report, the completed Air SWAT is not yet available. However, based on the results of the ground water analysis from other sites nearby, we can conclude that although landfill gas does affect water quality, we do not think that hazardous compounds originating in landfill gas have measurably affected ground water beneath the landfill. We feel that with time we can verify this, after we have gathered a larger data base. The data at this time is too limited to reach any firm conclusion. The gas analysis shows detectable limits of sixteen different compounds, and are presented in Appendix B.

CONCLUSIONS

HAZARDOUS MATERIALS ON SITE

Although records of waste received at Hewitt Landfill are poor, this site does not appear to contain hazardous materials at concentrations that would affect water quality. The site does not produce leachate. Only gas analyses show the presence of trace amounts of solvents.

LEAKAGE OF HAZARDOUS MATERIAL

There is no evidence of leakage of leachate from the Hewitt Landfill. The landfill gas does not appear to be releasing hazardous compounds into ground water.

GAS MIGRATION

There is little or no threat to water quality from gas migration. A gas control system was installed during the mid-1970's. Gas production has been declining with time. The drilling of the leachate well revealed little decomposed waste present. Water quality could be threatened, if the gas system were to cease operation before the fill fully decomposed. However, the gas system is planned to stay in operation.

REMEDIAL ACTION

We recommend continued vigilance in adjusting the gas system, maintenance of a low permeability cover, and maintenance of proper run-off control in order to prevent water from ponding on the site.

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EXPLANATION :

AF2	OLDER ALLUVIUM	HOLOCENE
AF1	VERY OLD ALLUVIUM	
Qal	QUATERNARY ALLUVIUM	
Qoal	OLDER ALLUVIUM	PLEISTOCENE
○	EXISTING WELL	
●	ABANDONED OR DESTROYED WELL	
⌖	WELL USED FOR SWAT	
4929	COUNTY WELL GRID NUMBER	
△	LYSIMETER WELL	
□	LEACHATE WELL	
⋰	FAULT	

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7½' VAN NUYS QUADRANGLE, PHOTOREVISED 1972 ; C.D.M.G. BULLETIN 196, 1975, SAN FERNANDO, CALIF. EARTHQUAKE OF 9 FEBRUARY 1971 .

LOCAL GEOLOGY AND WELL LOCATION MAP

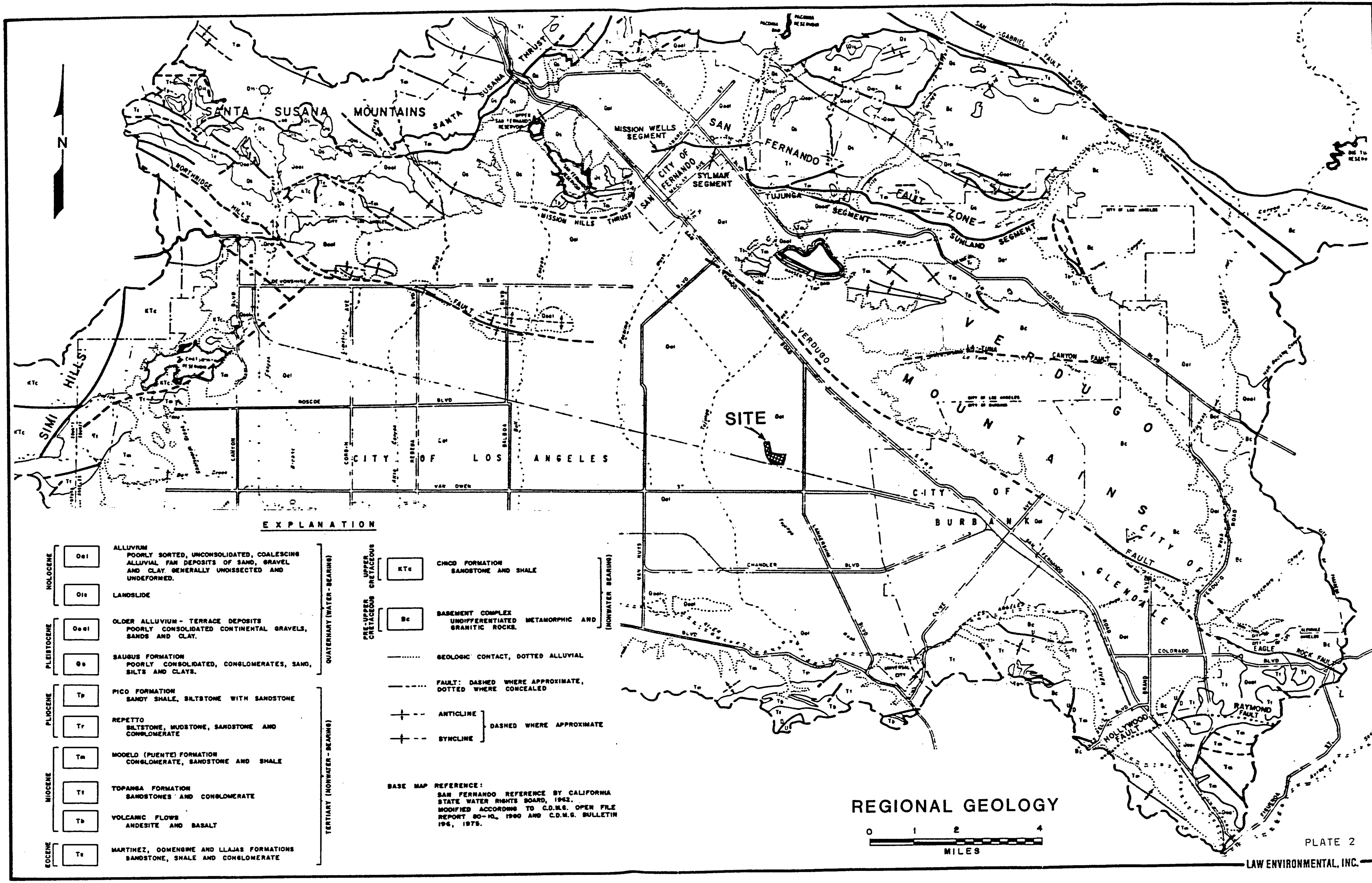
0 2000 4000
FEET

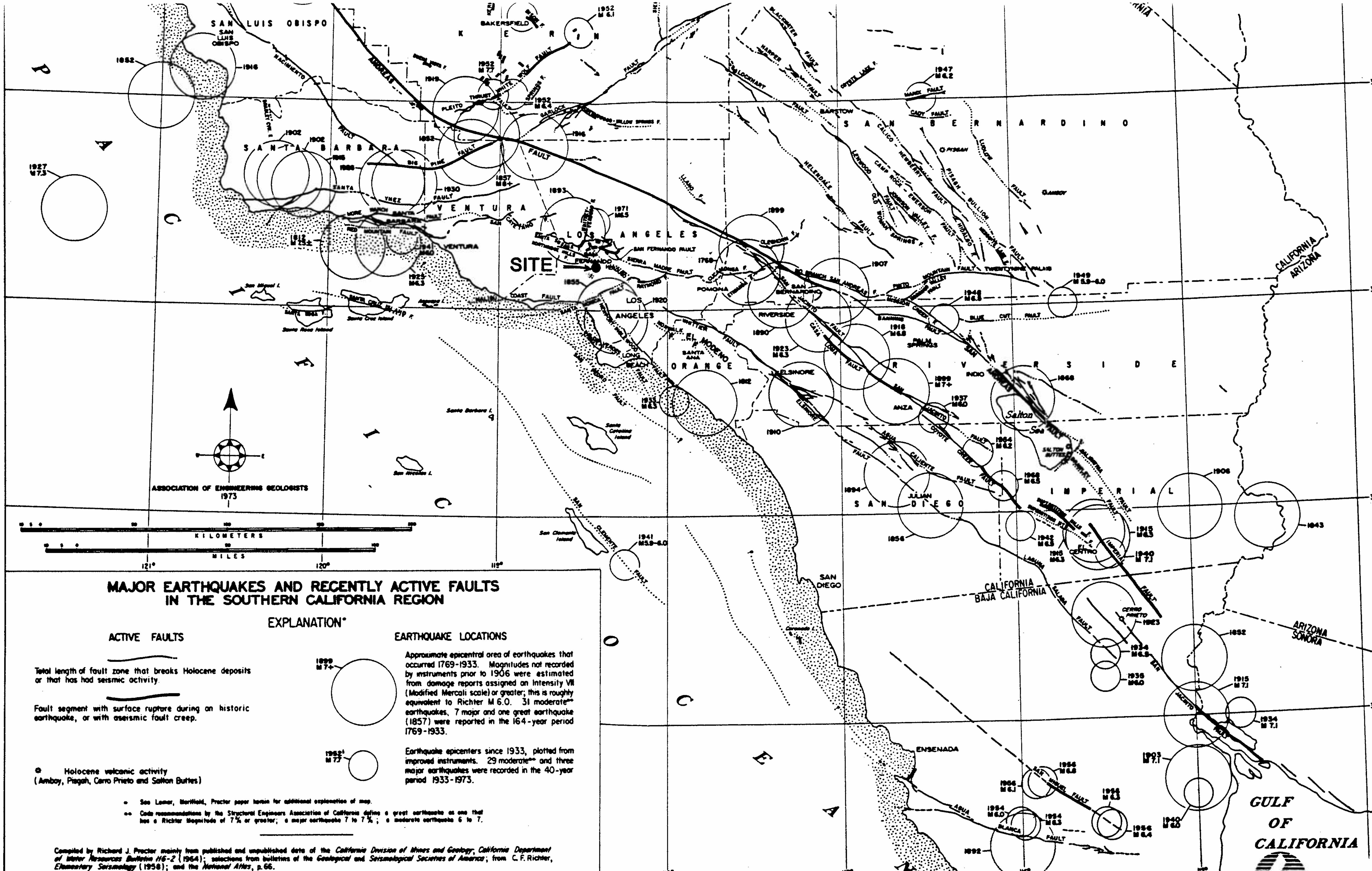
PLATE 1

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 5/23/88 PROJ. MGR. SMC DFTR. M.G.

PROJECT NO. 58-7057 DATE 5/23/88 PROJ.MGR. SMC DR. M.G.





MAJOR EARTHQUAKES AND RECENTLY ACTIVE FAULTS IN THE SOUTHERN CALIFORNIA REGION

EXPLANATION*

ACTIVE FAULTS

Total length of fault zone that breaks Holocene deposits or that has had seismic activity.

Fault segment with surface rupture during an historic earthquake, or with aseismic fault creep.

Holocene volcanic activity (Amboy, Pisgah, Cerro Prieto and Salton Buttes)

EARTHQUAKE LOCATIONS

1899 M 7+

Approximate epicentral area of earthquakes that occurred 1769-1933. Magnitudes not recorded by instruments prior to 1906 were estimated from damage reports assigned an Intensity VII (Modified Mercalli scale) or greater; this is roughly equivalent to Richter M 6.0. 31 moderate** earthquakes, 7 major and one great earthquake (1857) were reported in the 164-year period 1769-1933.

1952 M 7.7

Earthquake epicenters since 1933, plotted from improved instruments. 29 moderate** and three major earthquakes were recorded in the 40-year period 1933-1973.

* See Lamar, Merifield, Proctor paper herein for additional explanation of map.

** Code recommendations by the Structural Engineers Association of California define a great earthquake as one that has a Richter Magnitude of 7¾ or greater; a major earthquake 7 to 7¾; a moderate earthquake 6 to 7.

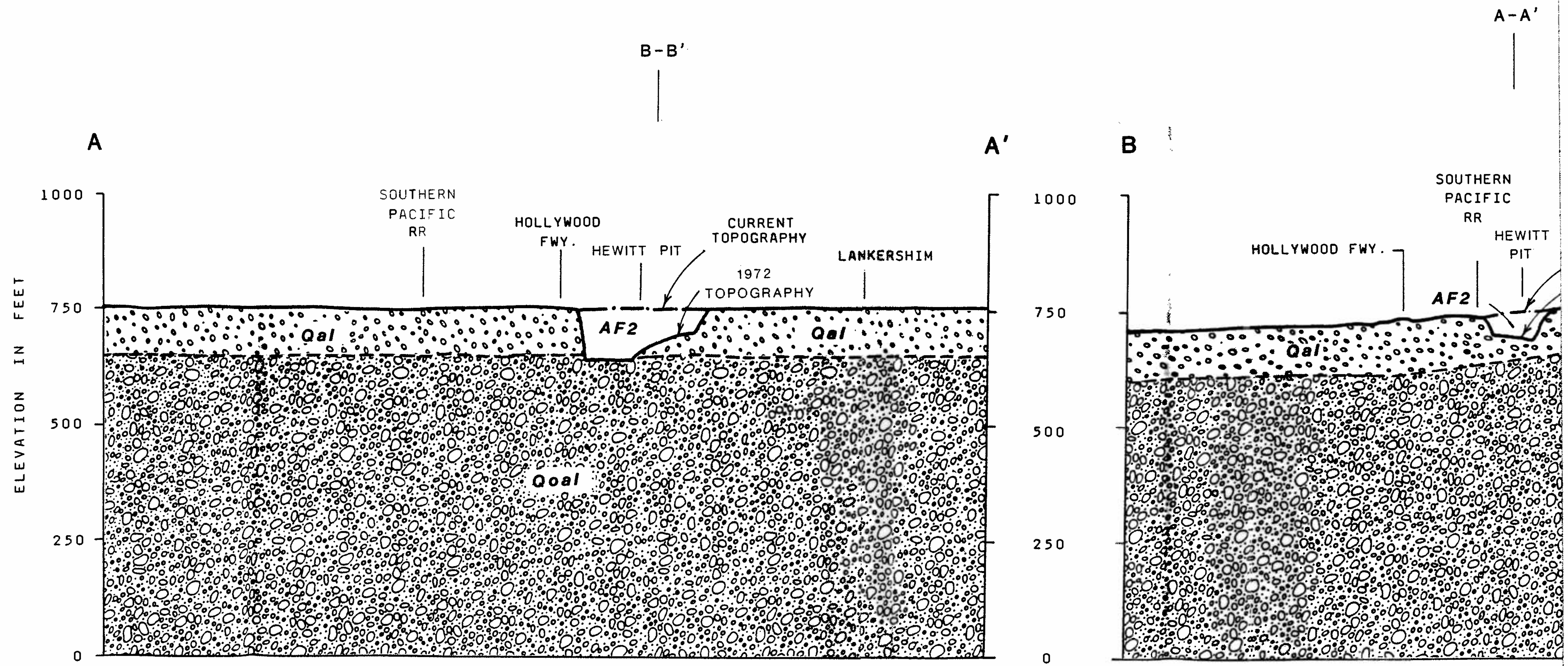
Compiled by Richard J. Proctor mainly from published and unpublished data of the *California Division of Mines and Geology*, *California Department of Water Resources Bulletin 116-2* (1964); selections from bulletins of the *Geological and Seismological Societies of America*; from C. F. Richter, *Elementary Seismology* (1958); and the *National Atlas*, p. 66.

REGIONAL SEISMICITY

PLATE 3

LAW ENVIRONMENTAL, INC.

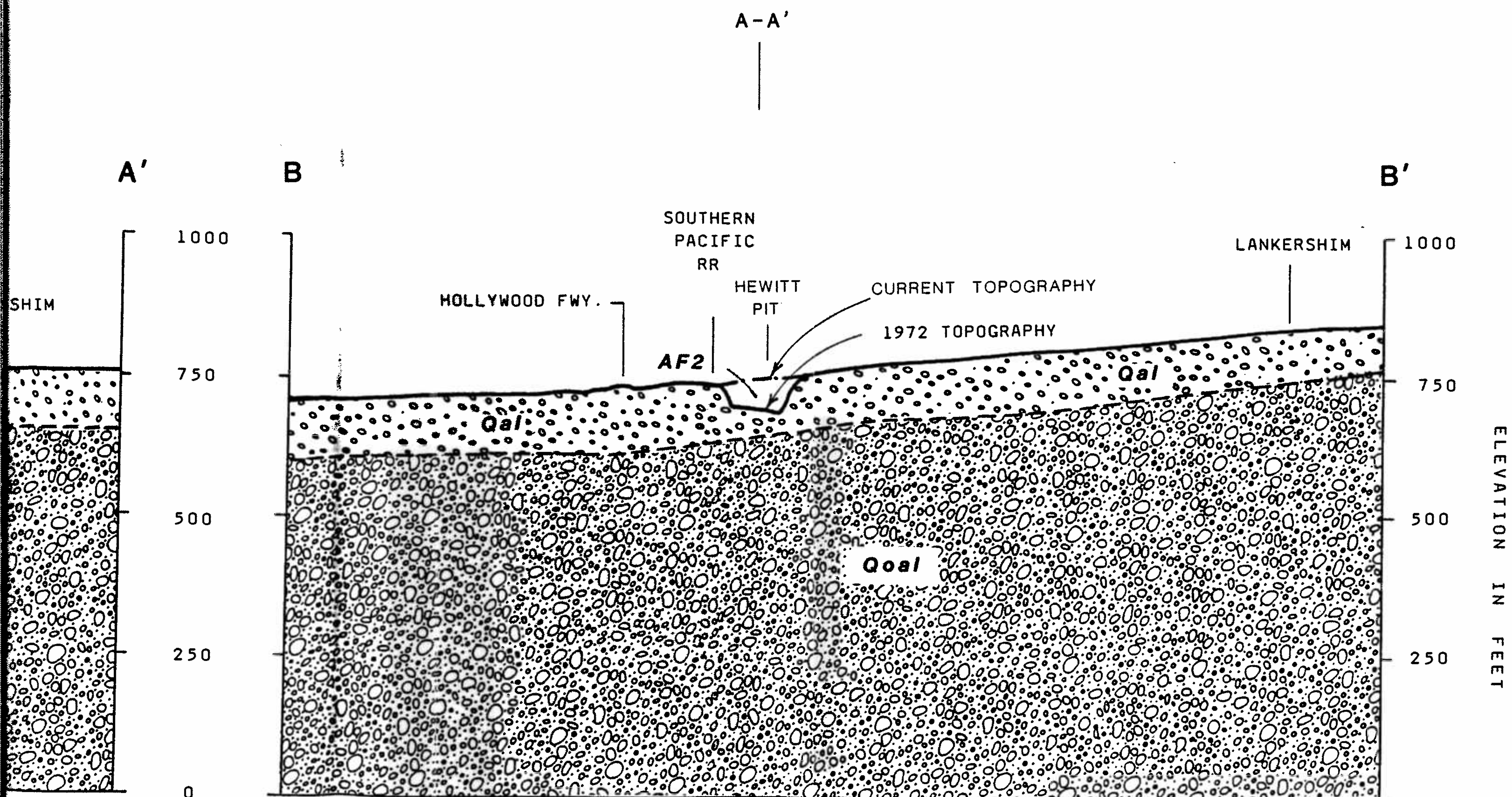
PROJECT No. 58-7057 DATE 6/2/88 PROJ. MGR. SM DFTR. M.G.



HORIZONTAL SCALE 1"= 2000'
VERTICAL SCALE 1"= 250'

NOTE : SEE PLATE 2 FOR EXPLANATION
OF GEOLOGIC UNITS

PROJ. NO. 58-7057 DATE 5/23/88 PROJ. MGR. TR. M.G.

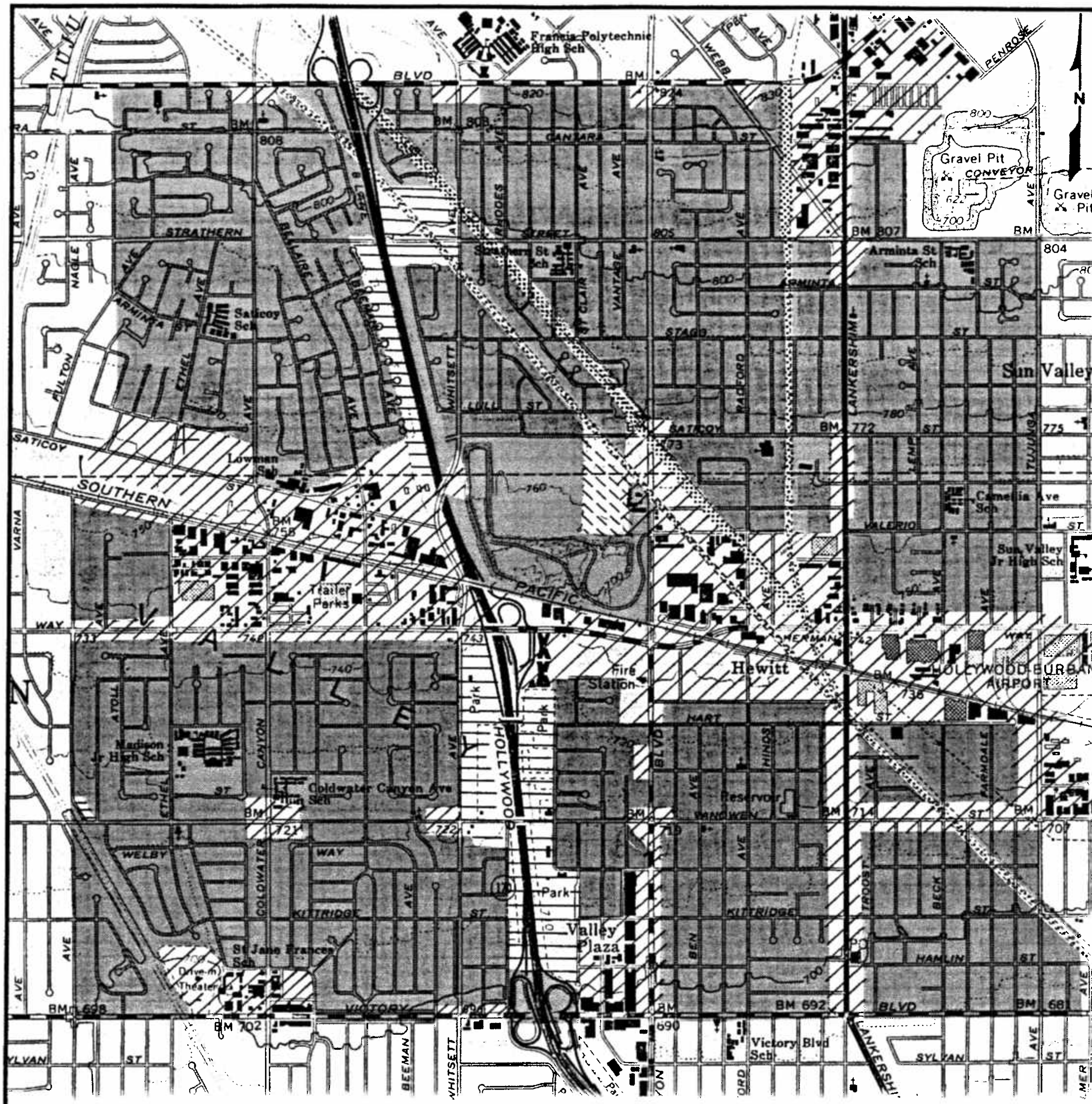


HORIZONTAL SCALE 1"= 2000'
VERTICAL SCALE 1"= 250'

GEOLOGIC SECTIONS
A-A' AND B-B'

PLATE 4

LAW ENVIRONMENTAL, INC.



EXPLANATION

- RECREATIONAL
- COMERCIAL AND INDUSTRIAL
- AGRICULTURE
- DWP RIGHT OF WAY
- RESIDENTIAL

REFERENCE :
BASEMAP FROM U.S. GEOLOGICAL SURVEY 7½ MINUTE VAN NUYS QUADRANGLE (1972) .

0 2000 4000
FEET

LAND USE MAP

PLATE 5

LAW ENVIRONMENTAL, INC.

PROJECT NO. 58-7057 DATE 6/3/88 PROJ. MGR. SMC DR. M.G.

EXPLANATION

4909C ● EXISTING WELL

520 GROUND WATER ELEVATION in feet asl

7 ft/year GROUND WATER, VELOCITY AND DIRECTION in feet/year

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½ VAN NUYS QUADRANGLE (1972) .

SCALE 1"=1000'

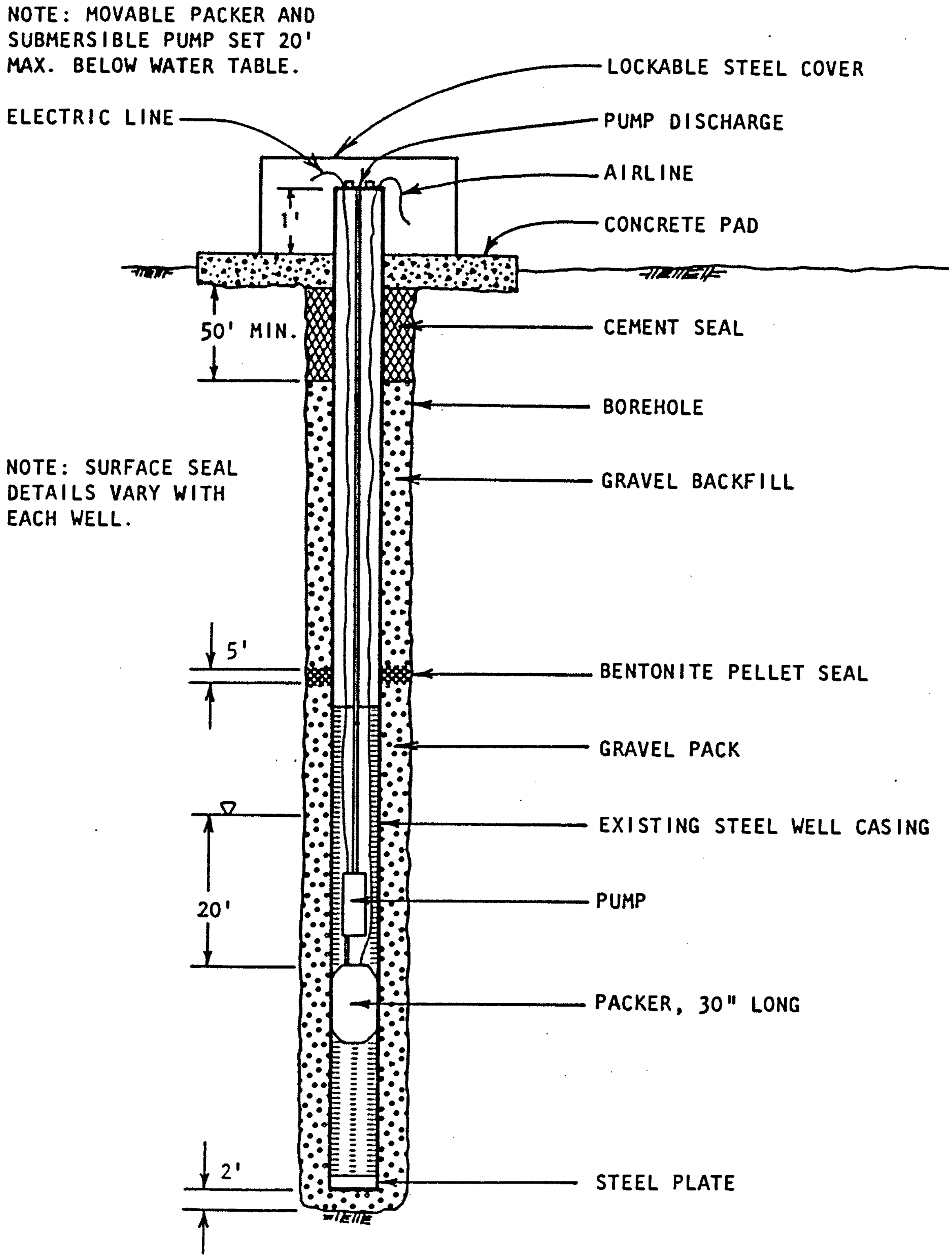
May 1988

GROUND WATER CONTOURS, VELOCITY AND FLOW DIRECTION

PLATE 6

LAW ENVIRONMENTAL, INC.

PROJ. No. 58-7057 DATE 5/31/88 PROJ. MGR. SHC TR. M.G.



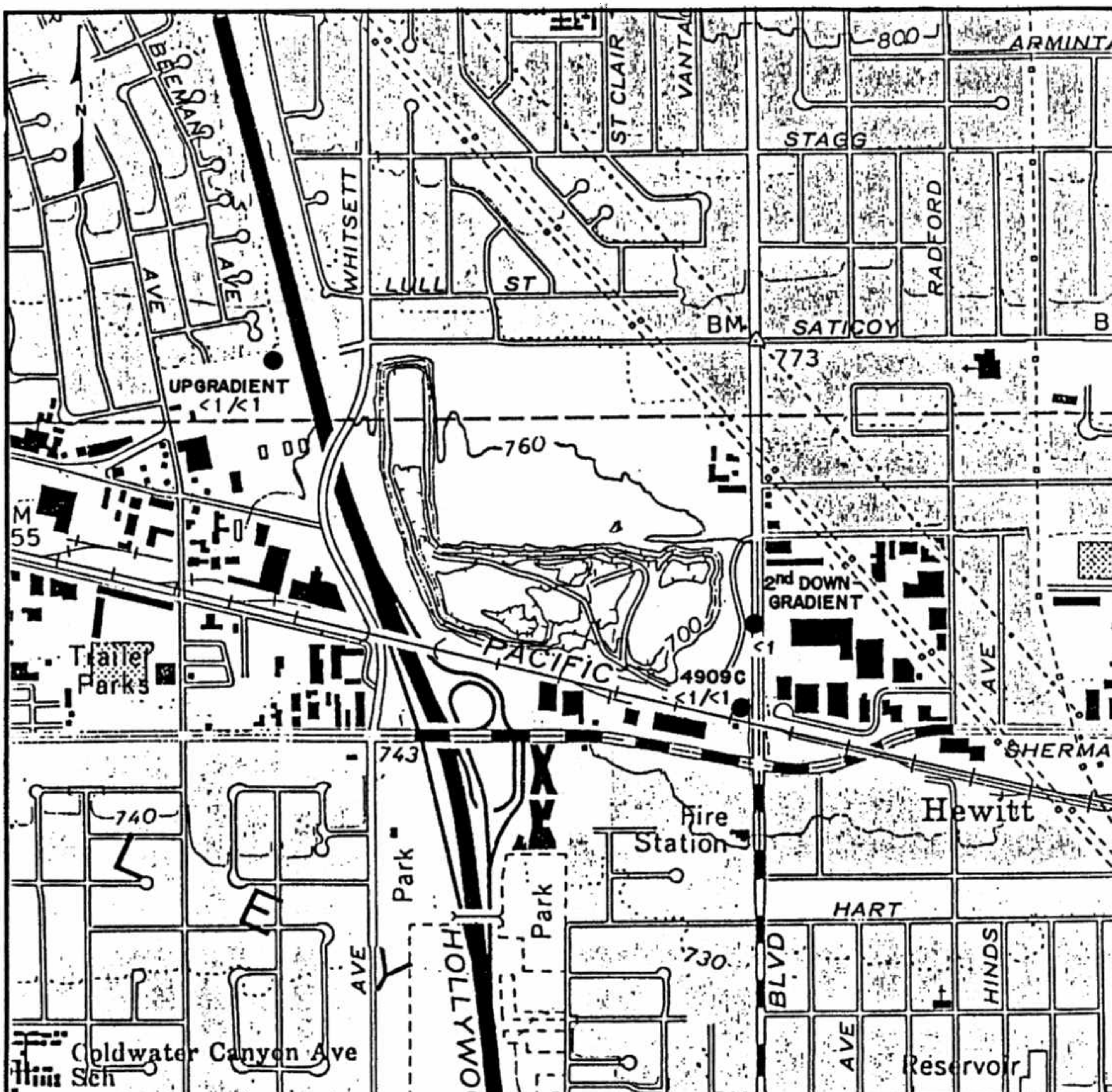
RETROFIT PACKER ASSEMBLY FOR NEW AND EXISTING WELLS AT HEWITT LANDFILL

NOT TO SCALE

PLATE 7

LAW ENVIRONMENTAL, INC.

PRC No. 58-7057 DATE 6/2/88 PROJ. MGR. SMC FTR. M.A.



EXPLANATION

4909C ● EXISTING WELL

<1/<1 Cl in mg/l
- May 1988
- Feb.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

February 1987 / May 1988

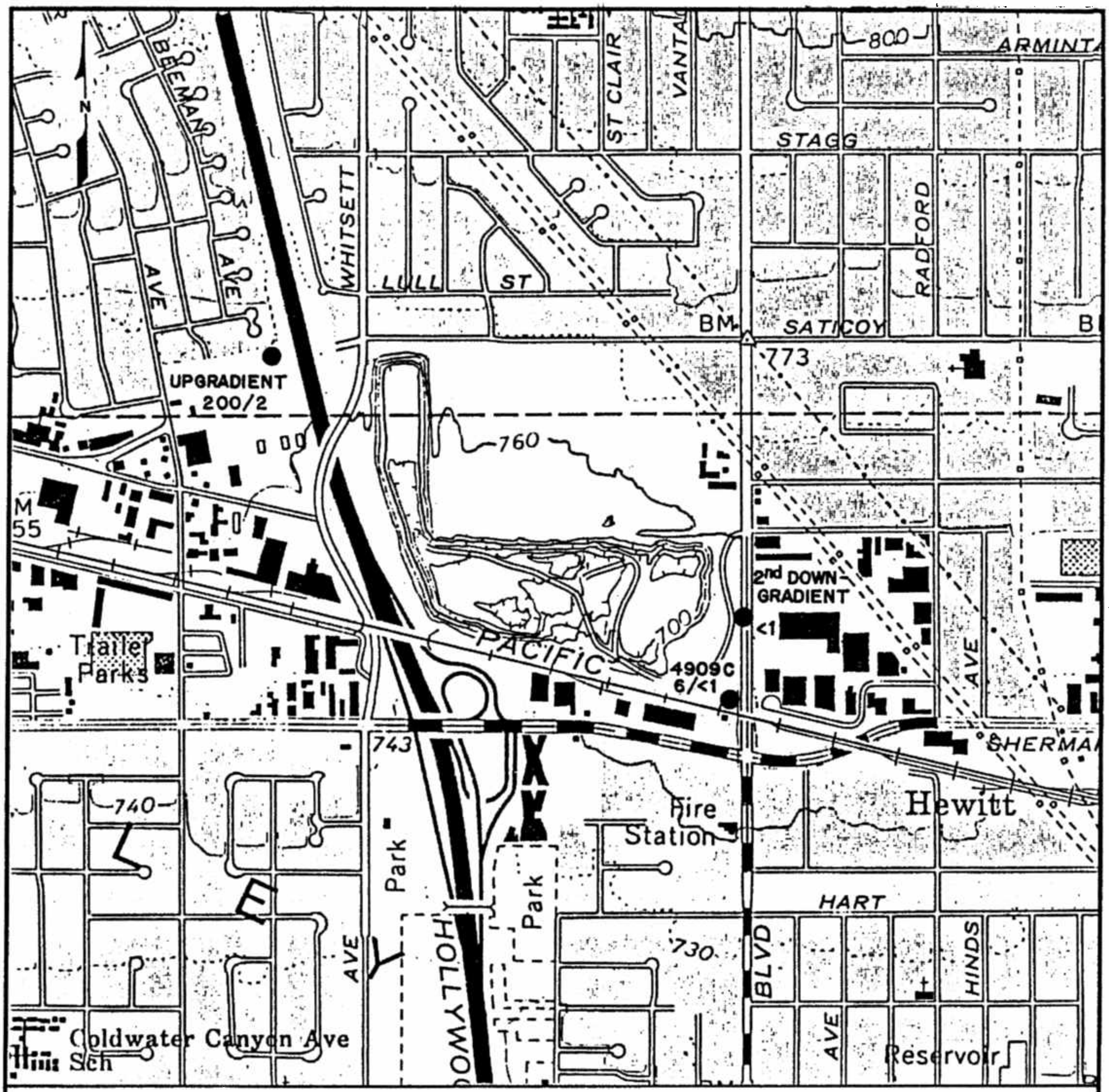
DCA CONCENTRATION

SCALE 1" = 1000'

PLATE 8

LAW ENVIRONMENTAL, INC.

PROJ. No. 58-7057 DATE 5/31/88 PROJ. MGR. SMC DFTR. M.G.



EXPLANATION

4909C ● EXISTING WELL

200 / 2 PCE in ppb
May 1988
Feb.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

February 1987 / May 1988

PCE CONCENTRATION

SCALE 1" = 1000'

PLATE 9

LAW ENVIRONMENTAL, INC.

PROJ. No. 58-7057 DATE 5/31/88 PROJ. MGR. SMc DR. M.G.

EXPLANATION

4909C ● EXISTING WELL

71/<1 TCE in ppb
May 1988
Feb.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

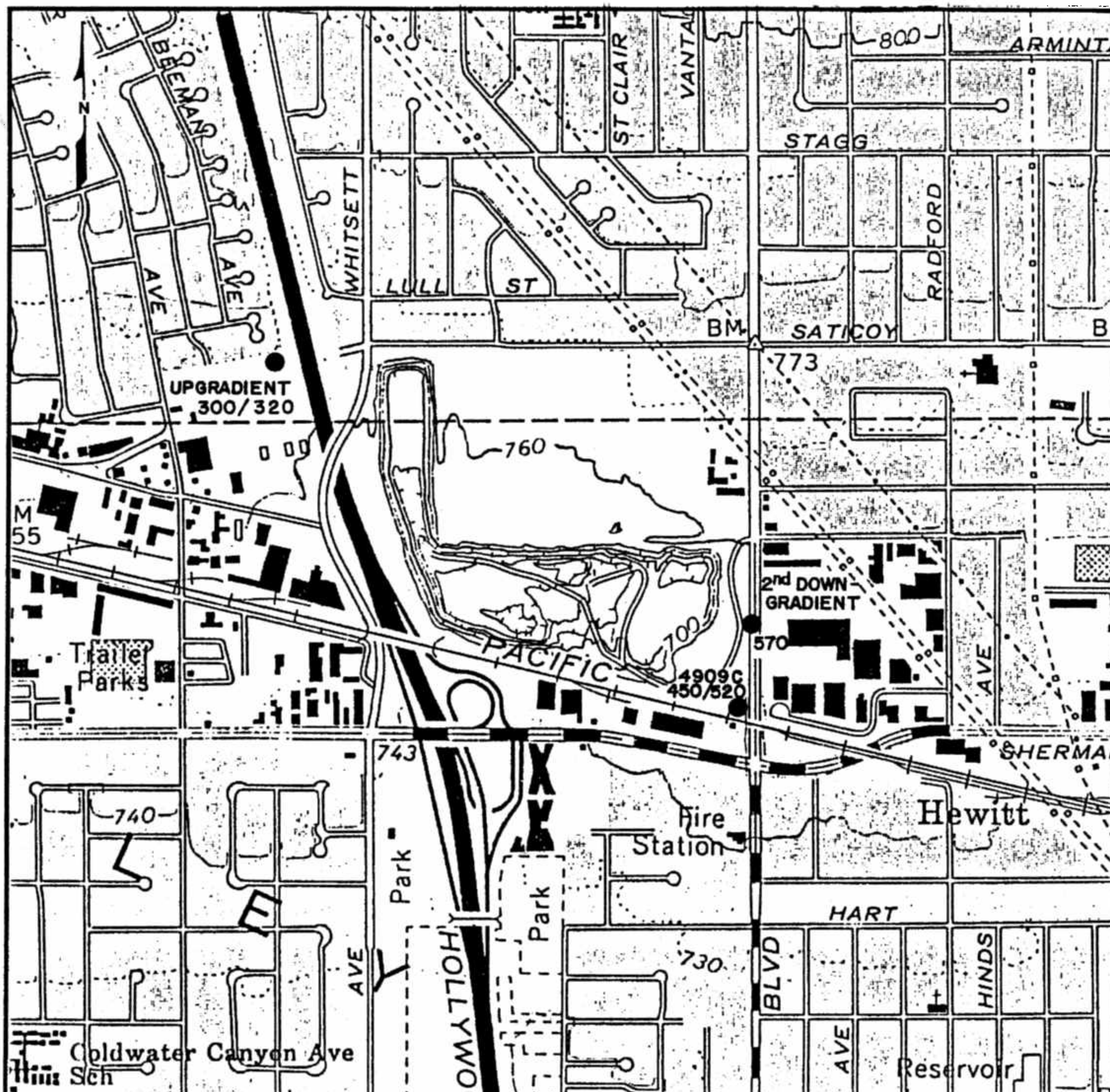
February 1987 / May 1988
TCE CONCENTRATION

SCALE 1" = 1000'

PLATE 10

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 5/31/88 PROJ. MGR. SMC DFTR. M.G.



EXPLANATION

4909C
● EXISTING WELL

450/520 TDS in mg/l
MAY 1988
FEB.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

February 1987 / May 1988

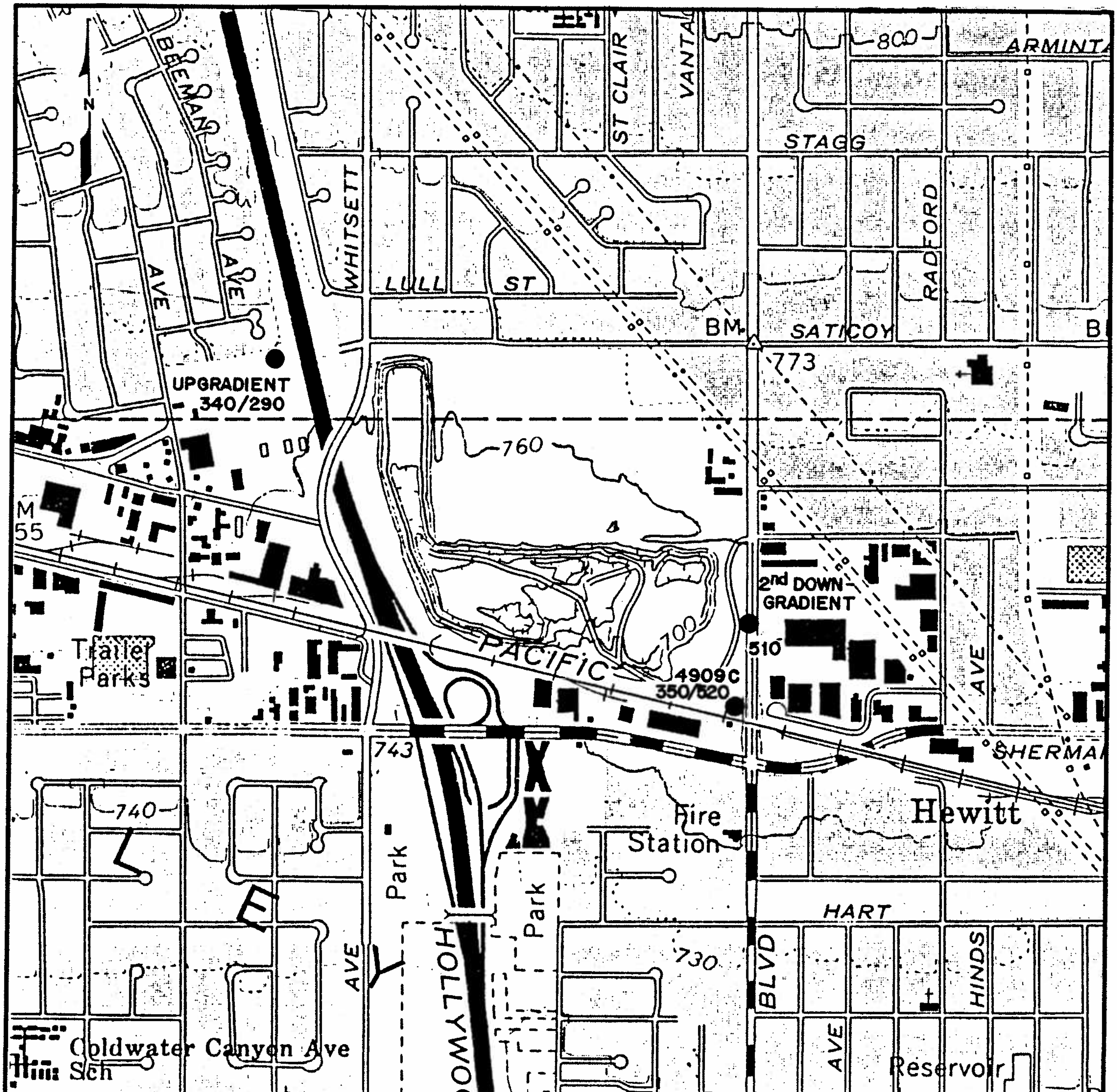
TDS CONCENTRATION

SCALE 1" = 1000'

PLATE 11

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 5/31/88 PROJ. MGR. SHC DFTR. M.G.



EXPLANATION

4909C
● EXISTING WELL

350/520 HCO - in mg/l
MAY 1988
FEB.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED NOVEMBER 1987

February 1987 / May 1988

HCO_3 CONCENTRATION

SCALE 1" = 1000'

PLATE 12

LAW ENVIRONMENTAL, INC.

PROJ. No. 58-7057 DATE 5/31/88 PROJ. MGR. SMC DTR. M.G.

EXPLANATION

4909C

● EXISTING WELL

28 / 14 — NO_3 in mg/l

May 1988

Feb.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

February 1987 / May 1988

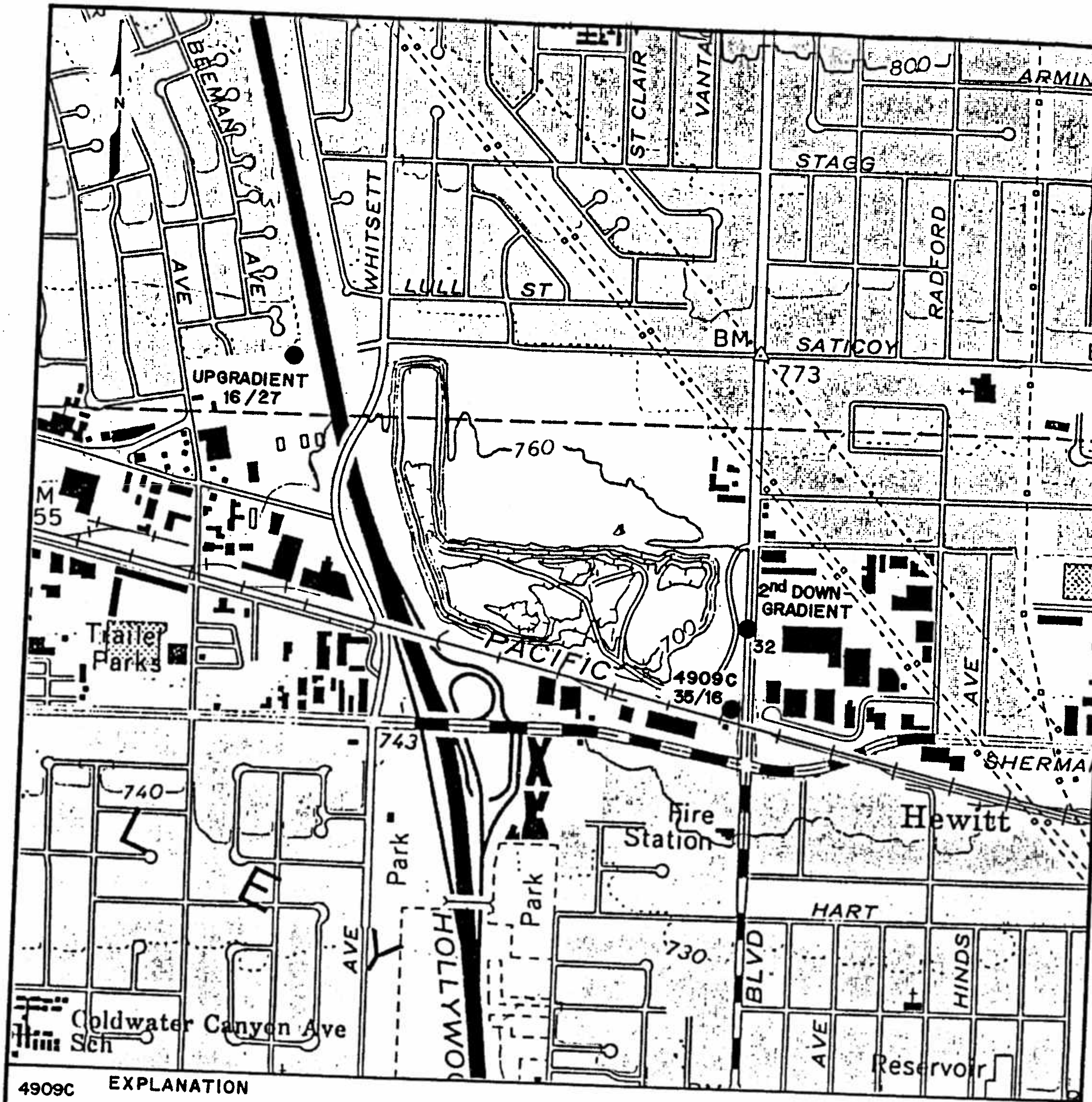
NO_3 CONCENTRATION

SCALE 1" = 1000'

PLATE 13

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 5/31/88 PROJ. MGR. SMC CTR. M.G.



4909C

EXPLANATION

● EXISTING WELL

35/16 — Cl in mg/l: May 1988 / Feb.1987

REFERENCE : BASEMAP FROM U.S. GEOLOGICAL SURVEY 7.5½' VAN NUYS QUADRANGLE (1972)

NOTE : 2nd DOWNGRADIENT WELL DRILLED ,NOVEMBER 1987

February 1987 / May 1988

Cl CONCENTRATION

SCALE 1" = 1000'

PLATE 14

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 5/31/88 PROJ. MGR. SMC DFTR. M.G.

APPENDIX A

RELATED CORRESPONDENCE

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

RECEIVED
LAW ENVIRONMENTAL, INC.
NOV 4 1987
File..
..................☐..................☐
..................☐..................☐

November 2, 1987

Mr. George Cosby
Cal Mat Company
3200 San Fernando Road
Los Angeles, California 90065

APPROVAL OF HEWITT LANDFILL SWAT PROPOSAL (FILE NO. 58-191)

We have reviewed your letter, dated September 25, 2987, in reply to our comments concerning the Hewitt Landfill SWAT Proposal.

Your SWAT Proposal for Hewitt Landfill is approved. Your final SWAT Report is due to this Board no later than July 1, 1988, although some monitoring data may have to be submitted later.

If you have any further questions, please call Myra Hart at (213) 620-2385.

Robert P. Ghirelli

ROBERT P. GHIRELLI, D.Env.
Executive Officer

RKD:MLH

cc: Jim Parsons, State Water Resource Control Board, Division of Water Quality
Glenn A. Brown, Law Environmental, Inc.

STATE OF CALIFORNIA

GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
'OS ANGELES REGION
.7 SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

September 8, 1987

Mr. George Cosby
CalMat Company
3200 San Fernando Road
Los Angeles, California 90065

SWAT PROPOSAL - HEWITT LANDFILL (File No. 58-191)

After reviewing your SWAT Proposal for the subject site, a meeting was held on July 16, 1987, with representatives of LeRoy Crandall and Associates in which we addressed the following deficiencies in the SWAT Proposal:

1. Existing well construction appears to be inadequate for SWAT ground water monitoring. The long perforated well screen lengths may not provide samples that meet our objectives of achieving a more depth-specific ground water analysis and ensuring minimal dilution of contaminants within the well casing. Please provide a ground water monitoring system which will meet our objectives.

2. Well number 3810C, the southernmost proposed downgradient well, is inadequate for SWAT ground water monitoring because sufficient well construction data is not presented. We require that the wells be positioned as close as possible to the compliance points of the landfill in order to ensure immediate detection of contaminants leaving the waste management unit. Please provide us with an additional downgradient well location. The best location appears to be along Laurel Canyon Boulevard at the northeast corner of the landfill.

3. In addition, please provide detailed drawings and data of the proposed well construction and location.

RECEIVED
LeRoy Crandall and Associates
SEP 10 1987
File: E87057
GAB ☑ ☐
SC ☐ ☐

Please submit comments and/or data concerning the above items to this office by September 30, 1987, in order that we may complete the review and approval process for your SWAT Proposal.

If you have any question, please contact Myra Hart at (213) 620-2385.

Dennis Dasker
for RAYMOND K. DELACOURT
Senior Water Resource
Control Engineer

RKD:MLH

cc: Glenn A. Brown, LeRoy Crandall and Associates
Bob Ford, State Water Resource Control Board, Division of Water Quality

September 25, 1987

Cal Mat Company
3200 San Fernando Road
Los Angeles, California 90065 (Our No. 58-7057)

Attention: Mr. George Cosby

Dear Mr. Cosby:

Responses to RWQCB Comments
SWAT Proposal
Hewitt Landfill
(File No. 58-191)

This letter presents our responses to the Regional Water Quality Control Board letter of September 8, 1987.

Comment: #1 - Adequacy of Exiting Wells

Response: The technical justification for having long screens is that the historic change in water levels at the site is about 200 feet. The aquifer is unconfined and has no locally extensive horizontal sublayers. So far, in this aquifer, we see little difference in monitoring results whether we pump wells or bail them, whether they have long or short screens, whether the screen goes above or is entirely below the water table. We have no convincing evidence that dilution occurs in pumped samples, or that devolatilization occurs in bailed samples. However, the existing wells can be modified to provide more depth specific water samples and reduce the chance of dilution of contaminants.

Figure 1 shows a proposed modification of the existing wells to meet these requirements. The wells would be fitted with a packer-pump combination intended to block flow from the lower part of the casing. This would produce the effect of a partially penetrating well in an unconfined aquifer. This is intended to meet the RWQCB requirement of sampling the uppermost aquifer.

For partially penetrating wells in unconfined aquifers, most of the water produced by the well comes from the sides of the cone of depression where the gradient is steepest. Note that any partially penetrating well, there is some upconing of water from beneath the end of the screen, so merely drilling a short well does not ensure that all water pumped comes from an area above the base of the well. (See Ground Water and Wells, pages 211 and 249.) Hydraulically, the packer-shortened well will behave the same as a truly short well. We do not anticipate any observable water quality changes whether the packer is in place or not.

Comment: #2 - Additional Downgradient Well

Response: The attached Figure 2 shows the proposed location of a new downgradient well. We believe a site a little south of the corner of the site will cover a wider area of the landfill, and ensure that the well is always downgradient of refuse.

Comment: #3 - Well Construction Details

Response: Figure 3 shows details of construction for the required new well, including the packer-pump assembly.

If you have any questions, please contact either Glenn Brown or Alice Campbell at (818) 848-0214, which is our new telephone number.

Yours very truly,

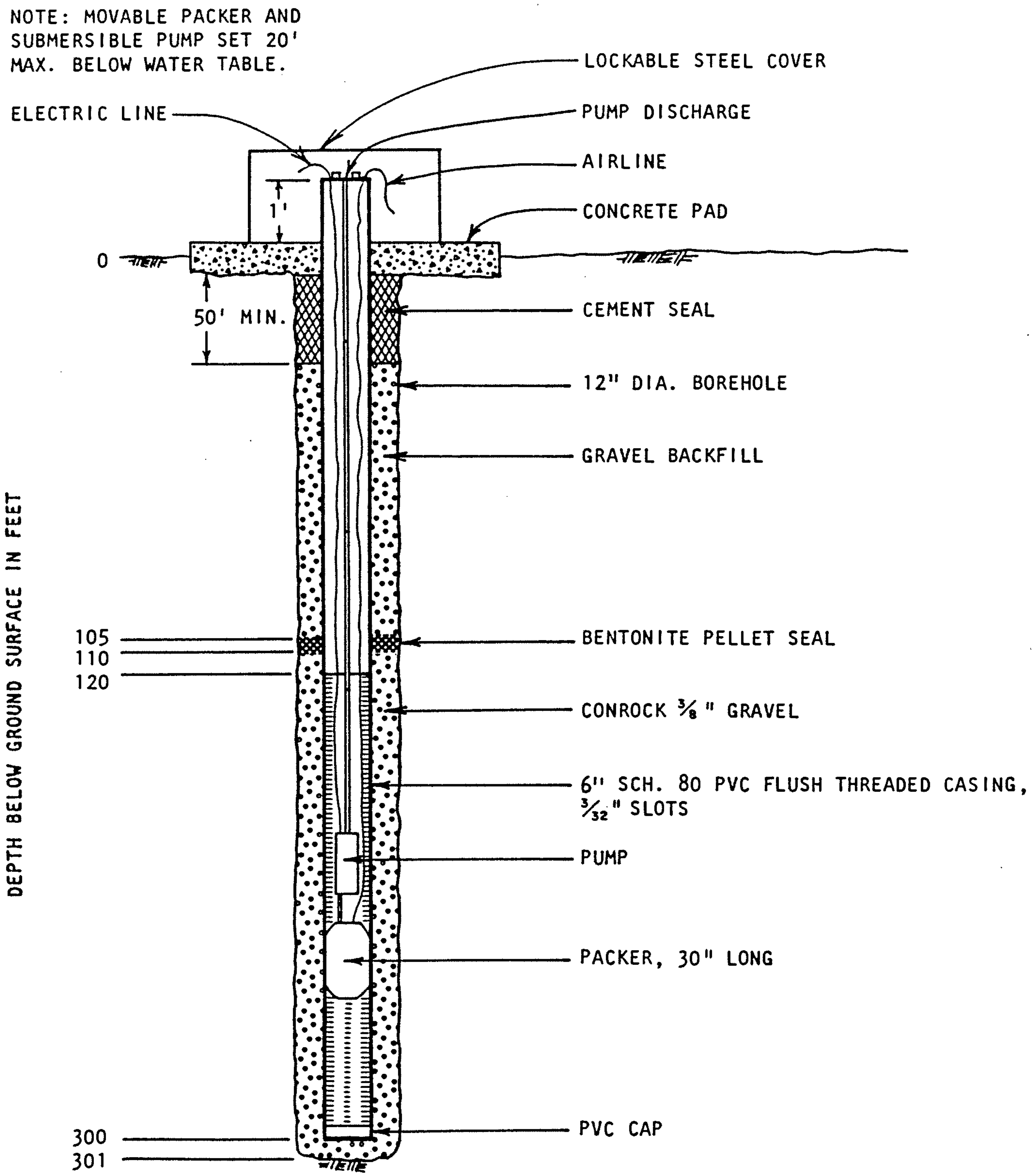
LAW ENVIRONMENTAL, INC.

by Alice Campbell

Alice Campbell C.E.G. 1157

by Glenn A Brown

Glenn A. Brown C.E.G. 3



HEWITT LANDFILL
PROPOSED MONITORING WELL CONSTRUCTION DETAILS

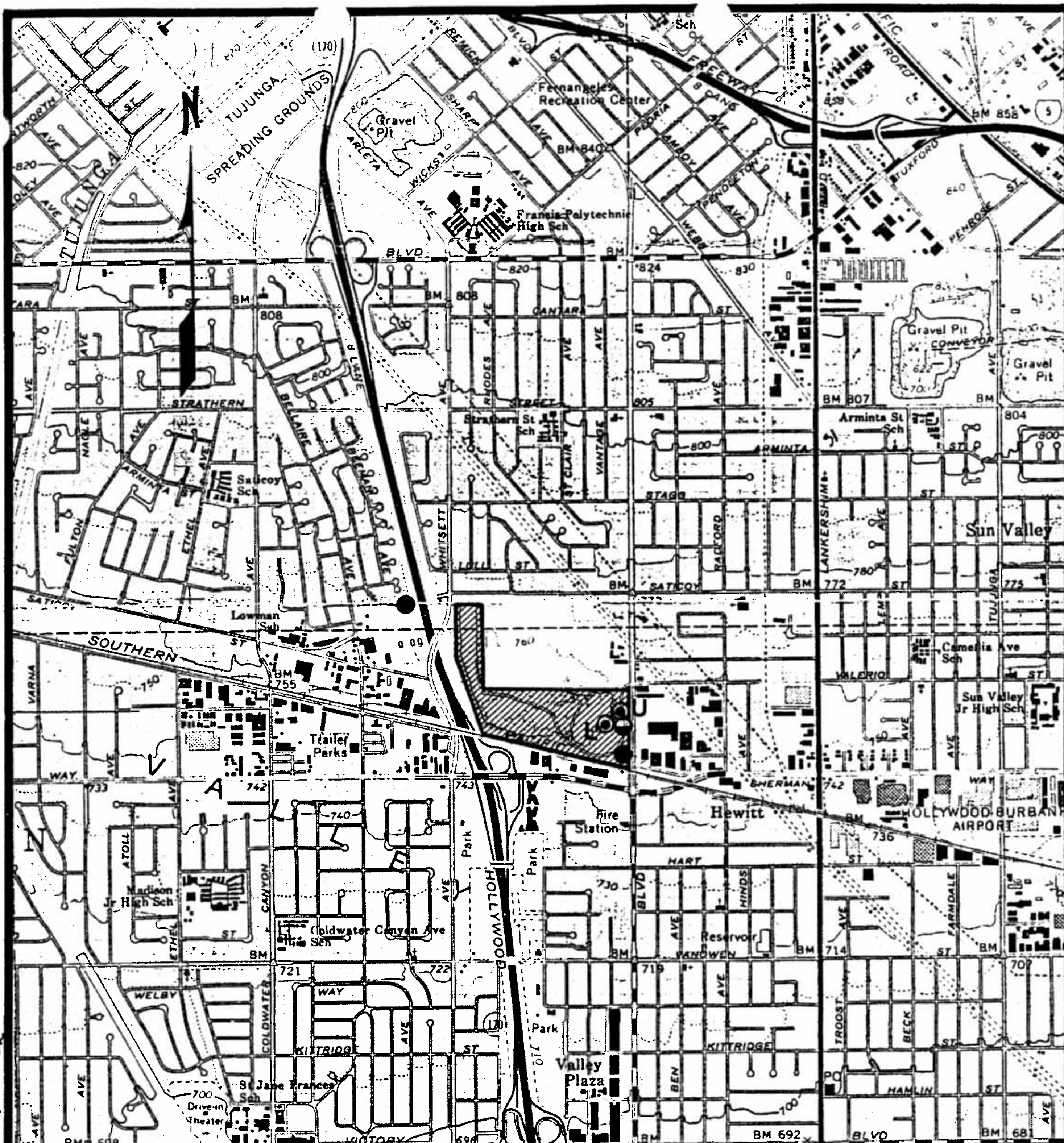
NOT TO SCALE

LeROY CRANDALL AND ASSOCIATES

FIGURE 1

JOB E87057 58-7057 DATE 09-17-87 DR. MA _G. AC W.P. CHKD.

FORM 17



EXPLANATION:

● MONITORING WELL

U◉ LYSIMETER

L◉ LEACHATE TEST HOLE

◓ NEW DOWNGRADIENT WELL

REFERENCE:

BASE MAP FROM U.S. GEOLOGICAL SURVEY 7½ MINUTE VAN NUYS QUADRANGLE, 1972.

0 1000 2000

SCALE IN FEET

LOCATION OF MONITORING POINTS

HEWITT LANDFILL

LeROY CRANDALL AND ASSOCIATES

FIGURE 2

JOB E-87057 58-7057 DATE 09-21-87 DR. MA O.E. AC W.P. CHKD

FORM 120

APPENDIX B

WATER AND GAS ANALYSIS

GROUND WATER DATABASE REV: Jun-88

POINT	DATE	WAT LEV (ft.) REF PT.	W S E	FIELD MEASUREMENTS (ppm) FpH	T(F)	ECf	CO2	LABORATORY ANALYSES (ppm) Alk	EC	LpH	Ca	Mg	Na	K	CO3	HCO3	SO4	Cl	NO3	B	F	TDS	COD	TOC
1-UP	08-Nov-84								830	7.8	11	14	34.0	3.5	0.0	30	220	3.2	15.0			420		
1-UP	27-Feb-87			7.7	63	720	6.0	153	570	7.5	50	20	46.0	13.0	0.0	340	<1	16.0	0.6			300		6.0
1-UP	04-Apr-88				62	498			620.0	7.8	88.0	13.0	30.0	3.0	<0.6	290.0	50.0	27.0	21.0	0.39	0.2	320	4.0	<0.08
2-DN	23-Jan-85								810	7.2	75	28	33.0	5.0		450	28	17.0				760	<3.0	
2-DN	27-Feb-87			7.1	63	580			760	7.6	110	19	30.0	4.4	0.0	350	56	35.0	28.0			450		<3.0
2-DN	04-Apr-88			7.8	63		27.0	463	810	8.0	120	22	43.0	5.0	<0.6	560	33	16.0	1.4	0.35	0.30	520	<3.0	0.2
3-DN	04-Apr-88			7.5	64	750	15.0	390	960	7.5	130	24	50.0	6.0	<0.6	510	50	32.0	48.0	0.52	0.20	570	<3.0	<0.08

GENERAL MINERAL(ppm)

		ORGANICS (ppb)			TRACE ELEMENTS (ppm)						TRACE ELEMENTS (ppm)					
POINT	DATE	TCE	PCE	1,2DCA	Al	Ag	As	Cd	Cu	Fe	Hg	Mn	Pb	Ni	Se	Zn
1-UP	08-Nov-84		3.0						<0.6	0.590		0.032				0.013
1-UP	27-Feb-87	45.0	200.0	<1					<0.2	<0.02		<0.050				<0.03
1-UP	04-Apr-88	<1	2.0	<1	<0.2	<0.02	<0.002	<0.02	<0.02	1.200	<0.0008	0.012	<0.002	<0.04	<0.004	0.170
2-DN	23-Jan-85	2.0	6.0						<0.14	<0.13		<0.04				<0.018
2-DN	27-Feb-87	71.0	6.0	<1	<0.2	<0.02	<0.002	<0.001	<0.02	<0.02	<0.0008	0.009	<0.002	<0.04	<0.004	<0.03
2-DN	04-Apr-88	<1	<1	<1	<0.2	<0.02	<0.002	<0.001	<0.02	1.300	<0.0008	0.008	<0.002	<0.04	<0.004	0.030
3-DN	04-Apr-88	<1	<1	<1	<0.2	<0.02	<0.002	<0.02	<0.02	0.900	<0.0008	0.050	<0.002	<0.04	<0.004	0.030

GENERAL MINERAL ANALYSIS*

BROWN AND CALDWELL
CONSULTING ENGINEERS
ANALYTICAL SERVICES DIVISION
373 SOUTH FAIR OAKS AVE.
PASADENA, CA 91105
PHONE (213) 795-7553

Log No. P84-11-118-1

Date Sampled 11/08/84
Date Received 11/08/84
Date Reported 12/06/84

Reported To: LeRoy Crandall
711 N. Alvarado Street
Los Angeles, CA 90026

Attn: Alice Campbell

cc.

Laboratory Director

Sample Description Hewitt Well #1

Anions	Miligrams per liter	Milliequiv. per liter	Determination	Milligrams per liter	Determination	Milligrams per liter
Nitrate Nitrogen (as NO_3)	15	0.24	Hydroxide Alkalinity (as $CaCO_3$)	0.0		
Chloride	22	0.63	Carbonate Alkalinity (as $CaCO_3$)	0.0		
Sulfate (as SO_4)	220	4.6	Bicarbonate Alkalinity (as $CaCO_3$)	250		
Bicarbonate (as HCO_3)	300	4.9	Calcium Hardness (as $CaCO_3$)	240		
Carbonate (as CO_3)	0.0	0.0	Magnesium Hardness (as $CaCO_3$)	60		
Total Milliequivalents per Liter		10	Total Hardness (as $CaCO_3$)	300		
Cations	**Milligrams per liter**	**Milliequiv. per liter**	Iron	< 0.059		
Sodium	34	1.5	Manganese	< 0.032		
Potassium	3.5	0.09	Copper	< 0.06		
Calcium	95	4.7	Zinc	< 0.013		
Magnesium	14	1.2	Foaming Agents (MBAS)	< 0.10		
Total Milliequivalents per Liter		7.5	Dissolved Residue, Evaporated @ 180°C	~~140,000~~[a] 420		
			Specific Conductance, micromhos @ 25°C	830	pH	7.8

*Conforms to Title 22, California Administrative Code (California Domestic Water Quality and Monitoring Regulations)

[a]Data rechecked and found to be true

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

Project: E-81001

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Mervin Johnson

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Purgeable Priority Pollutants	
Extraction date	11/19/84
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Ethylbenzene, ug/L	3
Tetrachloroethylene, ug/L	3
Toluene, ug/L	8
Other Purgeable Priority Pollutants, ug/L	<1
Semi-Quantified Results **	
Xylene Isomers, ug/L	20

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard

Edward Wilson
Edward Wilson, Laboratory Director

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Total Organic Carbon (TOC), mg/L	6	<3
Dissolved Digestion, Date	03/02/87	03/02/87

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Vol.Pri.Poll. (EPA-624)		
Extraction	03/13/87	03/13/87
Dilution Factor, Times 1	1	1
1,1,1-Trichloroethane, ug/L	9	4
1,1,2,2-Tetrachloroethane, ug/L	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1
1,1-Dichloroethane, ug/L	46	<1
1,1-Dichloroethylene, ug/L	10	<1
1,2-Dichloroethane, ug/L	<1	<1
1,2-Dichloropropane, ug/L	9	<1
1,3-Dichloropropene, ug/L	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Bromodichloromethane, ug/L	<1	<1
Bromomethane, ug/L	<1	<1
Benzene, ug/L	<1	<1
Chlorobenzene, ug/L	<1	<1
Carbon Tetrachloride, ug/L	<1	<1
Chloroethane, ug/L	<1	<1
Bromoform, ug/L	<1	<1
Chloroform, ug/L	6	<1
Chloromethane, ug/L	<1	<1
Dibromochloromethane, ug/L	<1	<1
Ethylbenzene, ug/L	<1	<1
Methylene Chloride, ug/L	2	<1

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Tetrachloroethylene, ug/L	200	6
Trichloroethylene, ug/L	45	71
Trichlorofluoromethane, ug/L	<1	<1
Toluene, ug/L	<1	<1
Vinyl Chloride, ug/L	<1	<1
trans-1,2-Dichloroethylene, ug/L	21	<1
trans-1,3-Dichloropropene, ug/L	<1	<1
Other Vol.Pri.Poll. (EPA-624)	---	---
Semi-Quantified Results **		
Dichlorofluoromethane, ug/L	70	---

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-1
Sample Description: Sample #1

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L
Nitrate (as NO3)	0.6	0.0097
Chloride	16	0.45
Sulfate	<1	<0.021
Bicarbonate (as HCO3)	340	5.6
Carbonate (as CO3)	0	0
Total Milliequivalents per Liter		6.1

Cations	mg/L	meq/L
Sodium	46	2
Potassium	13	0.33
Calcium (EDTA Titration)	50	2.5
Magnesium	20	1.6
Total Milliequivalents per Liter		6.4

Determination	mg/L
Hydroxide Alk (as CaCO3)	0.0
Carbonate Alk (as CaCO3)	0.0
Bicarb Alk (as CaCO3)	280
Ca Hardness (as CaCO3)	120
Mg Hardness (as CaCO3)	82
Total Hardness (as CaCO3)	202
Iron	<0.02
Manganese	0.050
Copper	<0.02
Zinc	<0.03
Surfactants	<0.1
Filterable Residue (TDS)	300
Sp. Conductance, umhos/cm	570
pH, units	7.5

* Conforms to Title 22, California Administrative Code

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
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Project: E-87057

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REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-2
Sample Description: Sample #2

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L
Nitrate (as NO3)	28	0.45
Chloride	35	0.99
Sulfate	56	1.2
Bicarbonate (as HCO3)	350	5.8
Carbonate (as CO3)	0	0
Total Milliequivalents per Liter		8.4

Cations	mg/L	meq/L
Sodium	30	1.3
Potassium	4.4	0.11
Calcium (EDTA Titration)	110	5.5
Magnesium	19	1.6
Total Milliequivalents per Liter		8.5

Determination	mg/L
Hydroxide Alk (as CaCO3)	0.0
Carbonate Alk (as CaCO3)	0.0
Bicarb Alk (as CaCO3)	290
Ca Hardness (as CaCO3)	270
Mg Hardness (as CaCO3)	78
Total Hardness (as CaCO3)	348
Iron	<0.02
Manganese	0.009
Copper	<0.02
Zinc	<0.03
Surfactants	0.0
Filterable Residue (TDS)	450
Sp. Conductance, umhos/cm	760
pH, units	7.6

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
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3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Boron, mg/L	0.39	0.52
Chemical Oxygen Demand, mg/L	4	<3
Oil and Grease, mg/L	<5	<5
Fluoride, mg/L	0.2	0.2
Total Organic Halides (TOX), mg/L	<0.08	<0.08
Aluminum, mg/L	<0.2	<0.2
Silicon, mg/L	9.3	10
Antimony, mg/L	<0.3	<0.3
Arsenic, mg/L	<0.002	<0.002
Barium, mg/L	0.13	0.25
Beryllium, mg/L	<0.001	<0.001
Cadmium, mg/L	<0.02	<0.02
Chromium, mg/L	<0.04	<0.04
Cobalt, mg/L	<0.04	<0.04
Lead, mg/L	<0.002	<0.002
Mercury, mg/L	<0.0008	<0.0008
Molybdenum, mg/L	<0.2	<0.2
Nickel, mg/L	<0.04	<0.04
Selenium, mg/L	<0.004	<0.004
Silver, mg/L	<0.02	<0.02
Thallium, mg/L	<0.2	<0.2
Vanadium, mg/L	<0.03	<0.03

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
B/N,A Ext.Pri.Poll. (EPA-625)		
Date Extracted	04/09/88	04/09/88
Date Analyzed	04/18/88	04/18/88
Dilution Factor, Times 1	1	1
1,2,4-Trichlorobenzene, ug/L	<10	<10
1,2-Dichlorobenzene, ug/L	<10	<10
1,2-Diphenylhydrazine, ug/L	<10	<10
1,3-Dichlorobenzene, ug/L	<10	<10
1,4-Dichlorobenzene, ug/L	<10	<10
2,4,6-Trichlorophenol, ug/L	<10	<10
2,4-Dichlorophenol, ug/L	<10	<10
2,4-Dimethylphenol, ug/L	<10	<10
2,4-Dinitrotoluene, ug/L	<10	<10
2,4-Dinitrophenol, ug/L	<25	<25
2,6-Dinitrotoluene, ug/L	<10	<10
2-Chloronaphthalene, ug/L	<10	<10
2-Methylnaphthalene, ug/L	<10	<10
2-Methyl Phenol, ug/L	<10	<10
2-Nitrophenol, ug/L	<10	<10
2-Nitroaniline, ug/L	<50	<50
2,4,5-Trichlorophenol, ug/L	<10	<10
2-Chlorophenol, ug/L	<10	<10
2-Methyl-4,6-dintrophenol, ug/L	<50	<50
3,3'-Dichlorobenzidine, ug/L	<10	<10
3-Nitroaniline, ug/L	<50	<50
4-Bromophenylphenylether, ug/L	<10	<10

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
4-Chloro-3-methylphenol, ug/L	<10	<10
4-Chlorophenylphenylether, ug/L	<10	<10
4-Chloroaniline, ug/L	<20	<20
4-Methyl Phenol, ug/L	<10	<10
4-Nitrophenol, ug/L	<25	<25
4-Nitroaniline, ug/L	<50	<50
Acenaphthene, ug/L	<10	<10
Acenaphthylene, ug/L	<10	<10
Aniline, ug/L	<20	<20
Anthracene, ug/L	<10	<10
Bis(2-ethylhexyl)phthalate, ug/L	<10	<10
Benzidine, ug/L	<40	<40
Benzoic Acid, ug/L	<50	<50
Benzyl Alcohol, ug/L	<20	<20
Bis(2-chloroethyl) Ether, ug/L	<10	<10
Bis(2-Chloroisopropyl)ether, ug/L	<10	<10
Bis(2-chloroethoxy)methane, ug/L	<10	<10
Benzo(a)anthracene, ug/L	<10	<10
Benzo(a)pyrene, ug/L	<10	<10
Benzo(b)fluoranthene, ug/L	<10	<10
Benzo(g,h,i)perylene, ug/L	<10	<10
Benzo(k)fluoranthene, ug/L	<10	<10
Butylbenzylphthalate, ug/L	<10	<10
Chrysene, ug/L	<10	<10
Di-n-octylphthalate, ug/L	<10	<10
Dibenzo(a,h)anthracene, ug/L	<10	<10

BROWN AND CALDWELL LABORATORIES

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Dibutylphthalate, ug/L	<50	<50
Diethylphthalate, ug/L	<10	<10
Dimethylphthalate, ug/L	<25	<25
Dibenzofuran, ug/L	<10	<10
Fluorene, ug/L	<10	<10
Fluoranthene, ug/L	<10	<10
Hexachlorobenzene, ug/L	<10	<10
Hexachlorobutadiene, ug/L	<10	<10
Hexachlorocyclopentadiene, ug/L	<10	<10
Hexachloroethane, ug/L	<10	<10
Indeno(1,2,3-c,d)Pyrene, ug/L	<10	<10
Isophorone, ug/L	<10	<10
N-Nitrosodi-n-propylamine, ug/L	<40	<40
N-Nitrosodimethylamine, ug/L	<80	<80
N-Nitrosodiphenylamine, ug/L	<10	<10
Naphthalene, ug/L	<10	<10
Nitrobenzene, ug/L	<10	<10
Pentachlorophenol, ug/L	<10	<10
Phenanthrene, ug/L	<10	<10
Phenol, ug/L	<10	<10
Pyrene, ug/L	<10	<10

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Vol.Pri.Poll. (EPA-624)		
Date Extracted	04/14/88	04/14/88
Dilution Factor, Times 1	1	1
1,1,1-Trichloroethane, ug/L	<1	<1
1,1,2,2-Tetrachloroethane, ug/L	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1
1,1-Dichloroethane, ug/L	<1	<1
1,1-Dichloroethylene, ug/L	<1	<1
1,2-Dichloroethane, ug/L	<1	<1
1,2-Dichlorobenzene, ug/L	<1	<1
1,2-Dichloropropane, ug/L	<1	<1
1,3-Dichlorobenzene, ug/L	<1	<1
cis-1,3-Dichloropropene, ug/L	<1	<1
1,4-Dichlorobenzene, ug/L	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1
2-Hexanone, ug/L	<1	<1
Acetone, ug/L	<10	<10
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Bromodichloromethane, ug/L	<1	<1
Bromomethane, ug/L	<1	<1
Benzene, ug/L	<1	<1
Chlorobenzene, ug/L	<1	<1
Carbon Tetrachloride, ug/L	<1	<1
Chloroethane, ug/L	<1	<1
Bromoform, ug/L	<1	<1

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Chloroform, ug/L	7	<1
Chloromethane, ug/L	<1	<1
Carbon Disulfide, ug/L	<1	<1
Dibromochloromethane, ug/L	<1	<1
Ethylbenzene, ug/L	<1	<1
Freon 113, ug/L	<1	<1
Methyl Isobutyl Ketone, ug/L	<1	<1
Methyl Ethyl Ketone, ug/L	<10	<10
Methylene Chloride, ug/L	<1	<1
Tetrachloroethylene, ug/L	2	<1
Styrene, ug/L	<1	<1
Trichloroethylene, ug/L	<1	<1
Trichlorofluoromethane, ug/L	<1	<1
Toluene, ug/L	<1	<1
Vinyl Acetate, ug/L	<10	<10
Vinyl Chloride, ug/L	<1	<1
Total Xylene Isomers, ug/L	<10	<10
trans-1,2-Dichloroethylene, ug/L	<1	<1
trans-1,3-Dichloropropene, ug/L	<1	<1

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ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
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Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-054-1
Sample Description: Well #1 (upgradient)

General Mineral Analysis
Sampled Date 04 APR 88

Anions	mg/L	meq/L
Nitrate (as NO3)	21	0.34
Chloride	27	0.76
Sulfate	50	1
Bicarbonate (as HCO3)	290	4.8
Carbonate (as CO3)	<0.6	<0.02
Total Milliequivalents per Liter		6.9

Cations	mg/L	meq/L
Sodium	30	1.3
Potassium	3	0.077
Calcium (EDTA Titration)	88	4.4
Magnesium	13	1.1
Total Milliequivalents per Liter		6.9

Determination	mg/L
Hydroxide Alk (as CaCO3)	<1
Carbonate Alk (as CaCO3)	<1
Bicarb Alk (as CaCO3)	240
Ca Hardness (as CaCO3)	220
Mg Hardness (as CaCO3)	53
Total Hardness (as CaCO3)	273
Iron	1.2
Manganese	0.012
Copper	<0.02
Zinc	0.17
Surfactants (MBAS)	<0.1
Filterable Residue (TDS)	320
Sp. Conductance, umhos/cm	620
pH, units	7.8

* Conforms to Title 22, California Administrative Code

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-054-2
Sample Description: Well #3 (2nd downgradient)

General Mineral Analysis
Sampled Date 04 APR 88

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	48	0.77	Hydroxide Alk (as CaCO3)	<1
Chloride	32	0.9	Carbonate Alk (as CaCO3)	<1
Sulfate	50	1	Bicarb Alk (as CaCO3)	420
Bicarbonate (as HCO3)	510	8.4	Ca Hardness (as CaCO3)	320
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	99
			Total Hardness (as CaCO3)	419
Total Milliequivalents per Liter		11.1	Iron	0.90
			Manganese	0.005
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	0.06
Sodium	50	2.2	Surfactants (MBAS)	<0.1
Potassium	6	0.15	Filterable Residue (TDS)	570
Calcium (EDTA Titration)	130	6.5	Sp. Conductance, umhos/cm	960
Magnesium	24	2	pH, units	7.5
Total Milliequivalents per Liter		10.9		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-554

Received: 26 APR 88
Reported: 17 MAY 88

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Chemical Oxygen Demand, mg/L	<3
Non-filterable Residue (TSS), mg/L	<5
Oil and Grease, mg/L	<5
Volatile Suspended Solids, mg/L	<5
Fluoride, mg/L	0.3
Total Organic Halides (TOX), mg/L	0.16
Aluminum, mg/L	<0.2
Boron, mg/L	0.35
Antimony, mg/L	<0.3
Arsenic, mg/L	<0.002
Barium, mg/L	0.23
Beryllium, mg/L	<0.001
Cadmium, mg/L	<0.0001
Chromium, mg/L	<0.04
Cobalt, mg/L	<0.04
Lead, mg/L	<0.002
Mercury, mg/L	<0.0008
Molybdenum, mg/L	<0.2
Nickel, mg/L	<0.04
Selenium, mg/L	<0.02
Silver, mg/L	<0.02
Thallium, mg/L	<0.2
Vanadium, mg/L	<0.03

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ANALYTICAL REPORT

LOG NO: P88-04-554

Received: 26 APR 88
Reported: 17 MAY 88

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
B/N,A Ext.Pri.Poll. (EPA-625)	
Date Extracted	04/29/88
Date Analyzed	05/13/88
Dilution Factor, Times 1	1
1,2,4-Trichlorobenzene, ug/L	<10
1,2-Dichlorobenzene, ug/L	<10
1,2-Diphenylhydrazine, ug/L	<10
1,3-Dichlorobenzene, ug/L	<10
1,4-Dichlorobenzene, ug/L	<10
2,4,6-Trichlorophenol, ug/L	<10
2,4-Dichlorophenol, ug/L	<10
2,4-Dimethylphenol, ug/L	<10
2,4-Dinitrotoluene, ug/L	<10
2,4-Dinitrophenol, ug/L	<25
2,6-Dinitrotoluene, ug/L	<10
2-Chloronaphthalene, ug/L	<10
2-Methylnaphthalene, ug/L	<10
2-Methyl Phenol, ug/L	<10
2-Nitrophenol, ug/L	<10
2-Nitroaniline, ug/L	<50
2,4,5-Trichlorophenol, ug/L	<10
2-Chlorophenol, ug/L	<10
2-Methyl-4,6-dintrophenol, ug/L	<50
3,3'-Dichlorobenzidine, ug/L	<10
3-Nitroaniline, ug/L	<50
4-Bromophenylphenylether, ug/L	<10
4-Chloro-3-methylphenol, ug/L	<10

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ANALYTICAL REPORT

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
4-Chlorophenylphenylether, ug/L	<10
4-Chloroaniline, ug/L	<20
4-Methyl Phenol, ug/L	<10
4-Nitrophenol, ug/L	<25
4-Nitroaniline, ug/L	<50
Acenaphthene, ug/L	<10
Acenaphthylene, ug/L	<10
Aniline, ug/L	<20
Anthracene, ug/L	<10
Bis(2-ethylhexyl)phthalate, ug/L	<10
Benzidine, ug/L	<40
Benzoic Acid, ug/L	<50
Benzyl Alcohol, ug/L	<20
Bis(2-chloroethyl) Ether, ug/L	<10
Bis(2-Chloroisopropyl)ether, ug/L	<10
Bis(2-chloroethoxy)methane, ug/L	<10
Benzo(a)anthracene, ug/L	<10
Benzo(a)pyrene, ug/L	<10
Benzo(b)fluoranthene, ug/L	<10
Benzo(g,h,i)perylene, ug/L	<10
Benzo(k)fluoranthene, ug/L	<10
Butylbenzylphthalate, ug/L	<10
Chrysene, ug/L	<10
Di-n-octylphthalate, ug/L	<10
Dibenzo(a,h)anthracene, ug/L	<10
Dibutylphthalate, ug/L	<50
Diethylphthalate, ug/L	<10

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-554

Received: 26 APR 88
Reported: 17 MAY 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Dimethylphthalate, ug/L	<25
Dibenzofuran, ug/L	<10
Fluorene, ug/L	<10
Fluoranthene, ug/L	<10
Hexachlorobenzene, ug/L	<10
Hexachlorobutadiene, ug/L	<10
Hexachlorocyclopentadiene, ug/L	<10
Hexachloroethane, ug/L	<10
Indeno(1,2,3-c,d)Pyrene, ug/L	<10
Isophorone, ug/L	<10
N-Nitrosodi-n-propylamine, ug/L	<40
N-Nitrosodimethylamine, ug/L	<80
N-Nitrosodiphenylamine, ug/L	<10
Naphthalene, ug/L	<10
Nitrobenzene, ug/L	<10
Pentachlorophenol, ug/L	<10
Phenanthrene, ug/L	<10
Phenol, ug/L	<10
Pyrene, ug/L	<10

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LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Vol.Pri.Poll. (EPA-624)	
Date Extracted	05/05/88
Dilution Factor, Times 1	1
1,1,1-Trichloroethane, ug/L	<1
1,1,2,2-Tetrachloroethane, ug/L	<1
1,1,2-Trichloroethane, ug/L	<1
1,1-Dichloroethane, ug/L	<1
1,1-Dichloroethylene, ug/L	<1
1,2-Dichloroethane, ug/L	<1
1,2-Dichlorobenzene, ug/L	<1
1,2-Dichloropropane, ug/L	<1
1,3-Dichlorobenzene, ug/L	<1
cis-1,3-Dichloropropene, ug/L	<1
1,4-Dichlorobenzene, ug/L	<1
2-Chloroethylvinylether, ug/L	<1
2-Hexanone, ug/L	<1
Acetone, ug/L	<10
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Bromodichloromethane, ug/L	<1
Bromomethane, ug/L	<1
Benzene, ug/L	<1
Chlorobenzene, ug/L	<1
Carbon Tetrachloride, ug/L	<1
Chloroethane, ug/L	<1
Bromoform, ug/L	<1
Chloroform, ug/L	<1

BROWN AND CALDWELL LABORATORIES
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REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Chloromethane, ug/L	<1
Carbon Disulfide, ug/L	<1
Dibromochloromethane, ug/L	<1
Ethylbenzene, ug/L	<1
Freon 113, ug/L	<1
Methyl Isobutyl Ketone, ug/L	<1
Methyl Ethyl Ketone, ug/L	<10
Methylene Chloride, ug/L	<1
Tetrachloroethylene, ug/L	<1
Styrene, ug/L	<1
Trichloroethylene, ug/L	<1
Trichlorofluoromethane, ug/L	<1
Toluene, ug/L	<1
Vinyl Acetate, ug/L	<10
Vinyl Chloride, ug/L	<1
Total Xylene Isomers, ug/L	<10
trans-1,2-Dichloroethylene, ug/L	<1
trans-1,3-Dichloropropene, ug/L	<1

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

LOG NO: P88-04-554

Received: 26 APR 88
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Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-554-1
Sample Description: Hewitt 1st Down gradients--4909C

General Mineral Analysis
Sampled Date 26 APR 88

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	1.4	0.023	Hydroxide Alk (as CaCO3)	<1
Chloride	16	0.45	Carbonate Alk (as CaCO3)	<1
Sulfate	32.5	0.677	Bicarb Alk (as CaCO3)	430
Bicarbonate (as HCO3)	520	8.6	Ca Hardness (as CaCO3)	300
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	90
			Total Hardness (as CaCO3)	390
Total Milliequivalents per Liter		9.8	Iron	1.3
			Manganese	0.008
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	0.03
Sodium	43	1.9	Surfactants (MBAS)	<0.1
Potassium	5.0	0.13	Filterable Residue (TDS)	520
Calcium (EDTA Titration)	120	6	Sp. Conductance, umhos/cm	810
Magnesium	22	1.8	pH, units	8.00
Total Milliequivalents per Liter		9.8		

* Conforms to Title 22, California Administrative Code

Jeffrey A. Erion, Laboratory Director

M 237 - 6/62 REV. - [illegible]

SANITARY ENGIN RING DIVISION

YEAR ________ ERLETA LANDFILL

LOCATION WELL 4897 (JAMES) CHEMICAL ANALYSES (P.P.M.)

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field ALK. $CaCO_3$ LAB.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. Kjel-N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	TDS	K_0 TS	
1966																															
-28		[illegible]	[illegible]	9.3	122	30	3.3	[illegible]	25	17	[illegible]	17	[illegible]	[illegible]	.11	7.8	21	.00	.08	.04	.17	7.4	2.1		4					.02	
1968																															
-23		1120	[illegible]	7.1	130	29	[illegible]	[illegible]	37	12	11	18	[illegible]	.42	.44	7.6 7.68	16 25	.00	.08	.33	.33	7.6	[illegible]		4			1.2		<.02	
1970																															
-18		499			167			[illegible]								7.7									4						
1971																															
21		[illegible]	[illegible]	[illegible]	236	-	-	[illegible]	36	17	4.0					[illegible]	17				.10	6.7			8					.05	
-26		760			256			[illegible]			1.8					7.3 [illegible]	24					7.6			22						
-22		856	100	33	[illegible]	[illegible]	[illegible]	[illegible]	41	13	[illegible]		.01			[illegible]	23				.13	[illegible]			[illegible]					[illegible]	
-7		991	112	[illegible]	392	60	11.9	412	44	11	3.3	20	<.01	.49	[illegible]	[illegible]	23	.00	.08	.000	.18	6.4			28					<.05	
-20		850						[illegible]								[illegible]						7.0			19						
-3		980	98	20	328			[illegible]			5.6		.01			7.5 [illegible]						5.2			24						
-17		926			344			[illegible] 410								7.1 7.86						7.8			20						
-8 *		950						[illegible]								-	[illegible]					8.6			5						
1972																															
.19		960	106	21	352	54	5.6	435 406	34	14	4.2	19	.02	.44	[illegible]	7.55	23	.00	.12	.000	.10	7.0			31					<.05	
1973																															
.26		976	[illegible]	26	440	43	4.3	[illegible] 515	33	13	2.2	22	.01	.62	.26	7.2 7.34	17 25	.00	.12	.000	.06	[illegible]	1.5		31				[illegible]	<.01	
.29		764			375			[illegible]	35	14						7.30					.07	8.2			28						
.19		670	80	15	260	47	4.4	[illegible] 312	35	11	6.7	20	.01	.42	.35	7.63	27					7.4			4						
-10		1000 796	120	24	400	117	5.2	480 430	30	14	4.4					7.19	17 25	.00	.08	.020	.06	3.6			38					[illegible]	1.8
1974																															
-13		[illegible]	[illegible]	15	250	44	4.3	290 [illegible]	42	11						[illegible]	[illegible]	.00	.04		.02	8.0			10				[illegible]		
-20		[illegible]	[illegible]	16	304	73	[illegible]	[illegible]	29	13						7.30	17 20					7.8			26				[illegible]		

* [illegible] pumped [illegible]

LOM 251 - [illegible]

SANITARY ENGINEERING DIVISION

YEAR

LOCATION WELL 4897A ([illegible])

CHEMICAL ANALYSES (P.P.M.)

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field Alk. CaCO3 Lab.	SO4	Cl	NO3	SiO2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH3	Tot. Kjel. N	NO2	Diss. PO4	Field D.O. Lab.	BOD	Cr+6	CO2	Turb	TAC	COD	TDS	Kb	
1966																															
-16		7[illegible]	91	7.4	370	26	4.3	378	40	22	3.0	22	.15	.26	.22	[illegible]	12	.02	.06	.66	.10	5.9	2.7		147	1				.01	PP
-28		1790	184	68	1000	41	7.6	[illegible]	25	20	2.7	29	6.0	.33	.02	6.82	12	.00	.12	.40	.21	0.9	17		60	36				.03	PP
1968																															
-23		[illegible]	278	71	986	50	7.7	[illegible]	26	[illegible]	2.2	27	.9	.39		6.4 6.7	17 25	.00	.24	.08	.22	0.5	4.4		219	38		12		.02	PP
-29		[illegible]	278	—	950	—	—	1000	—	--	—	—	1.2	.07			— —	—	—	—	—	2.1	—		257	—		11		—	PP
1970																															
-21		[illegible]	278	61	820	52	7.7	[illegible]	15	37	0.0					6.65	11 21		1.2		.24	0.0			205			15			PP
1-18		[illegible]	—	—	800	—	—	850	—	--	—					7.55	— -		—		—				176						PP
-5		1540	230	50	780	53	-	[illegible]	25	31	0.1				0.2	6.63	18 23		0.64			0			345					0.05	PP
1971																															
1-21		[illegible]	[illegible]	52	680			[illegible] 225	[illegible]	[illegible]	0.6					7.0 6.51	15 17				0.18	0			220		2.2			[illegible]	[illegible]
3-20		[illegible]	—	—	760			[illegible]			0.8					6.59	22				—	0			270					—	[illegible]
-21		[illegible]	210	50	730	50	[illegible]	[illegible]	[illegible]	[illegible]	1.2		1.6			7.61	[illegible]				0.13	0			[illegible]					[illegible]	[illegible]
-8		[illegible]						[illegible]														0			276						[illegible]
-19		1050						[illegible]			1.7					6.65						0			308						[illegible]
-2		1400	216	51	750			800								[illegible]	25					0			272						[illegible]
-10		[illegible]			495			[illegible]								6.7									220						[illegible]
-4	*	[illegible]						[illegible]								[illegible]						0			[illegible]						[illegible]
1972																															
-30		[illegible]	[illegible]	[illegible]	510	43	[illegible]	[illegible]	[illegible]	11	1.1	27	.13	.15	.17	6.76	26						1.8		126						[illegible]
1973																															
-20		[illegible]	170	24	400	33	4.3	[illegible]	34	11	—	10			.14	[illegible]	[illegible]					[illegible]			89		9.9		[illegible]		[illegible]
-23		1000						[illegible]								6.8						0.9			90						[illegible]
-24		[illegible]						[illegible]								[illegible]						0.7			100						[illegible]
-25		[illegible]														7.1						0.6			95						[illegible]

SANITARY ENGIN[illegible]ERING DIVISION

YEAR ______

LOCATION WELL 4897A ([illegible]) CHEMICAL ANALYSES (P.P.M.)

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hard-ness	Na	K	Field Alk. CaCO3 Lab.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. KJEL. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen.~~ COD	~~tn~~ TDS	$k_{D,TB}$	
1973																															
																															IP
5-10		[illegible]						[illegible]								7.7?						1.0			79						IP
-11		850?																													IP
-18		941			360?			[illegible]			1.6					7.04	25	.03	.14	.00	.08	7.7?	7.5				1.9	?			IP
-25		800																													IP
-24		796?	108?	22	360?	35	4.9	[illegible]	37	11						7.56?	26	.03	.15		.01	7.4									IP
1974																															
3-13		[illegible]	97?	22	317?	33	4.9	[illegible]	37	11						7.02	25	.02	.14		1.3	1.6?			-7?				466?		IP
9-18		[illegible]	[illegible]	[illegible]	320	32		370	[illegible]	[illegible]	[illegible]					6.87	22					8.8?			76						IP
1980																															
-28		1640	232	61	830	44	8.2	900	18	2.1	0.9					6.72	23				.17				360		17				
-26		1340	92?	46	332	42	6.6	120 / 120?	17	2.1	2.1	40				6.75	21 / 24	0.48	.80		.08	.7			168			14			
1983																															
-7		1600	181	54	680	40	6.0	770?	12	77			5.8?			7.0	19?								170	7					
-27		1220	165	46	600	43	6.0	565	14?	84		67			.72	7.39	25.1	.46	1.58		.02										

SANITARY ENGIN[illegible]ERING DIVISION

YEAR ____________

LOCATION WELL 489B (Stratford-Whitsett) CHEMICAL ANALYSES (P.P.M.) ARLETA

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field Alk. $CaCO_3$ Lab.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. Kjel. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	~~As~~ TDS		
1974																															
-17		5[illegible]	56	11	184	39	3.8	[illegible]	38	16	15					7.77	16 / 23					8.0			4						pp
-14		6[illegible]	7[illegible]	14	246	48	4.4	[illegible]	38	21	—					7.63	25					7.8			6						pp
-18		[illegible]	[illegible]	[illegible]	222	47	4.4	[illegible]	[illegible]	[illegible]	[illegible]					7.62	22					8.0			5						4.9
-16		639	72	13	232	44	4.1	250 / 240	40	20	35					7.70	17 / 23					8.2			7						
1975																															
-10		491	50	11	168	37	3.5	[illegible] / 170	38	20	12					8.0 / 7.95	18 / 24					8.0			54						
-8		725	86	15	276	50	4.3	[illegible] / 270	41	28	23					7.60	16 / 24					9.1			10		1.6				
24-77		516	54	11	180	38	2.5	215	35	12	7.9		.02	.48		7.78						9.2			7			4.0			
21-78		537	58	11	188	44	3.6	235 / 222	37	9.9	4.8		0.15			7.61						9.6			5			1.8			
-1-78		546	61	11	196	44	3.7	227 / 200	33	11	5.6		0.04			7.50	16 / 23					12.8			5			1.1			
-25-78		888	110	25	376	42	4.4	325	53	34	51		0.02			7.65	24														
6-79		710	85	15	272	53	4.6	320 / 325	30	13	6.0		0.04			7.59	16					11			8						
20-79		1020	136	26	445	50	5.2	410 / 400	60	28	53	23	0.09			7.31	16 / 25					9			35		5.2				
24-80		1060	190	28	465	54	5.7	430 / 440	77	33	44	18	<.01			7.66	16 / 22					9.6			32		1.1				
7-80		954	132	27	440	61	5.8	500 / 440	93	24	29	27	<.01			8.47						7.9			50						

S. J. ROGERS
JUL 10 1985

WATER QUALITY DIVISION
LAB REPORT OF ANALYSIS

Results in mg/l unless otherwise indicated

S. No	Date Taken	Date Rec'd	Collector	Description
5-1322	5-1-85	5-1-85	CWS	Janns Well (4897)
5-1323	"	"	"	McBride Well (4898)

Carl Spangenberg
JUL 10 1985

Sample No.	Date Anal	5-1322	Date Anal	5-1323	Date Anal		Date Anal		Date Anal		Date Anal	
Phenols (ppb)												
Total Solids	5/1 FF	312	5/1 FF	480								
Suspended Solids	5/1 FF	8.4	5/1 FF	0.3								
Dissolved Solids	5/1 FF	304	5/1 PE	480								
Oil and Grease												
Total Hardness (as $CaCO_3$)	5/1	278		330								
MPN/ml-Tot. Coliform												
MPN/ml-Fecal Coliform												
Lead (Pb)	5/23	<0.01	5/22	<0.01								
Cadmium (Cd)	5/18	<0.002	5/21	<0.002								
Manganese (Mn)	5/22	2.1	5/22	0.04								
Cyanide (CN)												
Bromide (Br^-)		<0.01	7/2 FF	0.32								
Selenium (Se)	5/1	<0.003	5/1	<0.003								
Iodide (I^-)	5/7	0.02	[illegible]	0.02								
Barium (Ba)	5/22	<0.1	5/22	0.3								
Zinc (Zn)	5/25	<0.01	[illegible]	<0.01								
Copper (Cu)	5/22	0.01	5/22	<0.01								
Silver (Ag)	5/22	<0.01	5/22	<0.01								
Mercury-mcg/litre (Hg)												
Total Chromium		<0.01		<0.01								
Hexavalent Chromium (Cr^{+6})	5/1	<.003		<.003								
Boron (B)	5/23	.37	5/23	0.42								
Iron (Fe)	5/2	1.45	5/2	0.01								
Aluminum (Al)	7/2	0.01	7/2	0.02								
Arsenic (As)	5/23	<0.01	5/23	<0.01								
Nickel (Ni)	5/22	<0.01	5/22	<0.01								

R. K. KURIMOTO
JUL 10 1985

REMARKS: Return Results to Carl Spangenberg

WS-234 Rev. 3/83

CHECKED BY

LOS [illegible]GELES DEPARTMENT OF WATER & P[illegible]ER
WATER QUALITY DIVISION

REPORT OF WATER ANALYSIS

(Chemical Results in Part, Per Million)

O. J. ROGERS
MAY 14 1984

Sample No.	Date Taken	Date Rec'd	Collector	Description
1300	4-24-84	4-24-84	DPG	Janns Well No. 4897
1301	"	"	"	Wicks Well No. 4897A

	Sample No.	Date Anal	1300	Date Anal	1301	Date Anal		Date Anal		Date Anal		Date Anal	
✓	Conductivity, µmhos/cm		4[illegible]2		4[illegible]								
	pH, Field		6.5		6.35								
✓	pH, Lab.	4/24 FE	7.05	4/24 PG	6.91		✓						
	Temperature °C, Field		16.5		15		✓						
✓	Temperature °C, Lab.	4/24 PG	[illegible].9	4/24 PG	23.0		✓						
✓	Calcium (Ca)		43		[illegible]		✓						
✓	Magnesium (Mg)		12		1[illegible]		✓						
✓	Total Hardness as $CaCO_3$		156		[illegible]		✓						
✓	Sodium (Na)	[illegible]	16		20		✓						
✓	Potassium (K)	[illegible]	[illegible]	[illegible]	7.6		✓						
	Alkalinity as $CaCO_3$ (Total), Field		142.5		217.5		✓						
✓	Lab		[illegible]		[illegible]		✓						
✓	Sulfate (SO_4)	[illegible]	7[illegible].6	[illegible]	[illegible].5		✓						
✓	Chloride (Cl)		12		1[illegible]		✓						
✓	Silica (SiO_2)	[illegible]	40	[illegible]	61		✓						
✓	Iron (Fe)	[illegible]	[illegible]	[illegible]	[illegible]		✓						
✓	Boron (B)	[illegible]	0.37	[illegible]	.4[illegible]		✓						
✓	Fluoride (F)	[illegible]	0.73	[illegible]	0.27		✓						
✓	Nitrate (NO_3)	[illegible]	[illegible]	[illegible]	[illegible]		✓						
✓	Nitrite (NO_2)	4/24 FE	0.03	4/24 FE	<0.001		✓						
✓	Ammonia (NH_3)	4/24 FE	0.12	4/24 FE	0.1[illegible]		✓						
✓	Total Kjeldahl Nitrogen (N)	[illegible]	0.38[illegible]		0.178		✓						
✓	Phosphate (PO_4)	[illegible]	[illegible]	[illegible]	0.16		✓						
✓	Syndets (Apparent LAS)	[illegible]	<[illegible]	[illegible]	<[illegible]								
✓	TDS	[illegible]	28[illegible]	[illegible]	328		✓						
	CO_2 (Field)		17		24		✓						
	Dissolved Oxygen (field)		1.6		2.5		✓						
	Pumping Depth												
	Standing Water (above pump)												
	Gallons Pumped												

R. K. KURIMOTO
MAY 14 1984

REMARKS: Results to D.P.G.

FORM 201 — Rev. 3/83 WS-235

CHECKED BY

MAY 20 1985

MAY 20 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP - Water Quality	REPORT PREPARED BY: (SIGNATURE) [signature]	DATE OF REPORT: 5-16-85
SYSTEM NAME:		NUMBER: 05707
WELL NAME AND/OR NUMBER:		STATE WELL NUMBER:
DESCRIPTION OF SAMPLING POINT: Mc Bride (4898)		
NAME OF SAMPLER: C W Spangenberg		SAMPLER EMPLOYED BY: DWP
DATE/TIME SAMPLE COLLECTED: 5-1-85	DATE/TIME SAMPLE RECEIVED @ LAB: 5-1-85	DATE ANALYSES COMPLETED: 5-6-85
TEST METHODS: 624 GC/MS		Were all the constituents listed below quantified? yes

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/1	34030	ND	0.1
Bromodichloromethane	ug/1	32101	ND	0.5
Bromoform	ug/1	32104	ND	0.5
Bromomethane	ug/1	34413	ND	0.5
Carbon tetrachloride	ug/1	32102	ND	0.5
Chlorobenzene	ug/1	34301	ND	0.1
Chloroethane	ug/1	34311	ND	0.5
2-Chloroethylvinyl ether	ug/1	34576	ND	0.5
Chloroform	ug/1	32106	ND	0.5
Chloromethane	ug/1	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/1	34273	ND	0.1
Dibromochloromethane	ug/1	32105	ND	1.0
1,2-Dichlorobenzene	ug/1	34536	ND	0.5
1,3-Dichlorobenzene	ug/1	34566	ND	0.5
1,4-Dichlorobenzene	ug/1	34571	ND	0.5
Dichlorodifluoromethane	ug/1	34668	ND	0.1
1,1-Dichloroethane	ug/1	34496	ND	0.5
1,2-Dichloroethane	ug/1	34531	ND	0.5
1,1-Dichloroethene	ug/1	34501	ND	0.2
trans-1,2-Dichloroethene	ug/1	34546	ND	0.5
1,2-Dichloropropane	ug/1	34541	ND	0.5
cis-1,3-Dichloropropene	ug/1	34704	ND	0.5

RGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ans-1,3-Dichloropropene	ug/l	34699	ND	0.15
hyl benzene	ug/l	34371	ND	0.15
ethy ne chloride	ug/l	34423	ND	0.15
ethyl Ethyl Ketone	ug/l	81595	ND	1.10
ethyl Isobutyl Ketone	ug/l	81596	ND	1.10
,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.15
etrachloroethene	ug/l	34475	<0.15	0.15
oluene	ug/l	34010	ND	0.11
,1,1-Trichloroethane	ug/l	34506	ND	0.15
,1,2-Trichloroethane	ug/l	34511	ND	0.15
richloroethene	ug/l	39180	ND	0.15
richlorofluoromethane	ug/l	34488	ND	0.15
inyl chloride	ug/l	39175	ND	0.15
ylenes	ug/l	81551	ND	0.11

Note any unidentified peaks below

Chloropicrin	ug/l	ND	5.0
DBCP	ug/l	ND	5.0
1, 3 Trichloropropane	ug/l	ND	0.5
cis 1, 2 dichloroethene	ug/l	ND	0.5

SE SD
DLB-5/

JAN 15 1985

O. J. ROGERS

JAN 15 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP - water Quality	REPORT PREPARED BY: (SIGNATURE) F. Bordey	DATE OF REPORT: 1-10-85
SYSTEM NAME:		NUMBER: 05437
WELL NAME AND/OR NUMBER:		STATE WELL NUMBER:
DESCRIPTION OF SAMPLING POINT: Mc Bride (4898)		
NAME OF SAMPLER: Peter R.		SAMPLER EMPLOYED BY: DWP
DATE/TIME SAMPLE COLLECTED: 12-20-84	DATE/TIME SAMPLE RECEIVED @ LAB: 12-20-84	DATE ANALYSES COMPLETED: 12-28-84
TEST METHODS: GC/MS		Were all the constituents listed below quantified? Yes

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	ND	0.1
Bromodichloromethane	ug/l	32101	ND	0.15
Bromoform	ug/l	32104	ND	1.0
B[illegible]omethane	ug/l	34413	ND	0.15
Ca[illegible]n tetrachloride	ug/l	32102	ND	0.15
Chlorobenzene	ug/l	34301	ND	0.1
Chloroethane	ug/l	34311	ND	0.15
2-Chloroethylvinyl ether	ug/l	34576	ND	3.0
Chloroform	ug/l	32106	ND	0.15
Chloromethane	ug/l	34418	ND	0.15
bis (2-Chloroethyl) ether	ug/l	34273	ND	50.1
Dibromochloromethane	ug/l	32105	ND	1.0
1,2-Dichlorobenzene	ug/l	34536	ND	0.15
1,3-Dichlorobenzene	ug/l	34566	ND	0.15
1,4-Dichlorobenzene	ug/l	34571	ND	0.15
Dichlorodifluoromethane	ug/l	34668	ND	40.1
1,1-Dichloroethane	ug/l	34496	ND	0.15
1,2-Dichloroethane	ug/l	34531	ND	0.15
1,1-Dichloroethene	ug/l	34501	ND	0.15
trans-1,2-Dichloroethene	ug/l	34546	ND	0.15
1[illegible]-Dichloropropane	ug/l	34541	ND	0.15
cis [illegible],3-Dichloropropene	ug/l	34704	ND	0.15

URGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
rans-1,3-Dichloropropene	ug/l	34699	ND	0.15
thy enzene	ug/l	34371	ND	0.15
ethylene chloride	ug/l	34423	ND	0.15
ethyl Ethyl Ketone	ug/l	81595	ND	10.1
ethyl Isobutyl Ketone	ug/l	81596	ND	3.10
,1,2,2-Tetrachloroethane	ug/l	34516	ND	1.10
etrachloroethene	ug/l	34475	ND	0.15
Toluene	ug/l	34010	ND	0.11
1,1,1-Trichloroethane	ug/l	34506	ND	0.15
1,1,2-Trichloroethane	ug/l	34511	ND	1.10
Trichloroethene	ug/l	39180	ND	0.15
Trichlorofluoromethane	ug/l	34488	ND	0.15
Vinyl chloride	ug/l	39175	ND	0.15
ylenes	ug/l	81551	ND	0.11

Note any unidentified peaks below

Chloropicrin	ug/l	ND	5.0
DBCP	ug/l	ND	5.0

SEB-SD
DLB-5/84

JEFF DOBROWOLSKI
MAR 31 1986

... ROGERS
MAR 26 1986

M. Thur
3-28-86

MAR 26 1986
Shirley Cheng

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) Fe Bordey	DATE OF REPORT: 3-24-86
SYSTEM NAME:		NUMBER: 05836
WELL NAME AND/OR NUMBER:	STATE WELL NUMBER:	
DESCRIPTION OF SAMPLING POINT: Janss Well (4897)		
NAME OF SAMPLER: JGD	SAMPLER EMPLOYED BY: DWP	
DATE/TIME SAMPLE COLLECTED: 3-11-86	DATE/TIME SAMPLE RECEIVED @ LAB: 3-11-86	DATE ANALYSES COMPLETED: 3-14-86
TEST METHODS: 624 GC/MS	Were all the constituents listed below quantified? yes	

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/1	34030	0.11	0.11
Bromodichloromethane	ug/1	32101	ND	0.15
Bromoform	ug/1	32104	ND	0.15
Bromomethane	ug/1	34413	ND	0.15
Carbon tetrachloride	ug/1	32102	ND	0.15
Chlorobenzene	ug/1	34301	ND	0.11
Chloroethane	ug/1	34311	ND	0.15
2-Chloroethylvinyl ether	ug/1	34576	ND	0.15
Chloroform	ug/1	32106	ND	0.15
Chloromethane	ug/1	34418	ND	0.15
bis (2-Chloroethyl) ether	ug/1	34273	ND	5.10
Dibromochloromethane	ug/1	32105	ND	0.15
1,2-Dichlorobenzene	ug/1	34536	ND	0.15
1,3-Dichlorobenzene	ug/1	34566	ND	0.15
1,4-Dichlorobenzene	ug/1	34571	ND	0.15
Dichlorodifluoromethane	ug/1	34668	ND	2.10
1,1-Dichloroethane	ug/1	34496	ND	0.15
1,2-Dichloroethane	ug/1	34531	ND	0.15
1,1-Dichloroethene	ug/1	34501	ND	0.12
trans-1,2-Dichloroethene	ug/1	34546	ND	0.15
1,2-Dichloropropane	ug/1	34541	ND	0.15
cis-1,3-Dichloropropene	ug/1	34704	ND	0.15

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
trans-1,3-Dichloropropene	ug/1	34699	ND	0.5
Ethy[illegible]enzene	ug/1	34371	ND	0.5
Methylene chloride	ug/1	34423	ND	0.5
Methyl Ethyl Ketone	ug/1	81595	ND	5.0
Methyl Isobutyl Ketone	ug/1	81596	ND	1.0
1,1,2,2-Tetrachloroethane	ug/1	34516	ND	0.5
Tetrachloroethene	ug/1	34475	ND	0.5
Toluene	ug/1	34010	0.7	0.1
1,1,1-Trichloroethane	ug/1	34506	0.9	0.5
1,1,2-Trichloroethane	ug/1	34511	ND	0.5
Trichloroethene	ug/1	39180	ND	0.5
Trichlorofluoromethane	ug/1	34488	ND	0.5
Vinyl chloride	ug/1	39175	ND	0.5
Xylenes	ug/1	81551	ND	0.1
Cis 1, 2 dichloroethene	ug/l		ND	0.5
1, 2, 3 Trichloropropane	ug/l		ND	0.5

JEFF DOBROWOLSKI
FEB 19 1986

U. J. ROGERS
FEB 1 6 1986

Shirley Cheng
2-3 1 1986

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ORATORY E: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) Fc Bordey	DATE OF REPORT: 2-18-86 NUMBER: 05784
TEM E:		STATE WELL NUMBER:
L NAME /OR NUMBER:		
CRIPTION OF PLING POINT: Sheldon Arleta 4897		SAMPLER EMPLOYED BY: DWP
IE OF PLER: J. Dobrowolski	DATE/TIME SAMPLE RECEIVED @ LAB: 2-11-86	DATE ANALYSES COMPLETED: 2-13-86
TE/TIME PLE COLLECTED: 2/11/86		Were all the constituents listed below quantified? yes
ST METHODS: 624 GC/MS		

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
nzene	ug/1	34030	2.2	0.1
omodichloromethane	ug/1	32101	ND	0.5
omoform	ug/1	32104	ND	0.5
omo ethane	ug/1	34413	ND	0.5
arbon tetrachloride	ug/1	32102	ND	0.5
hlorobenzene	ug/1	34301	ND	0.1
hloroethane	ug/1	34311	ND	0.5
-Chloroethylvinyl ether	ug/1	34576	ND	0.5
hloroform	ug/1	32106	ND	0.5
hloromethane	ug/1	34418	ND	0.5
is (2-Chloroethyl) ether	ug/1	34273	ND	5.0
ibromochloromethane	ug/1	32105	ND	0.5
1,2-Dichlorobenzene	ug/1	34536	8.6	0.5
1,3-Dichlorobenzene	ug/1	34566	1.7	0.5
1,4-Dichlorobenzene	ug/1	34571	8.1	0.5
Dichlorodifluoromethane	ug/1	34668	ND	2.0
1,1-Dichloroethane	ug/1	34496	ND	0.5
1,2-Dichloroethane	ug/1	34531	ND	0.5
1,1-Dichloroethene	ug/1	34501	ND	0.2
trans-1,2-Dichloroethene	ug/1	34546	ND	0.5
1, Dichloropropane	ug/1	34541	ND	0.5
cis-1,3-Dichloropropene	ug/1	34704	ND	0.5

PURGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
rans-1,3-Dichloropropene	ug/l	34699	ND	0.5
thyl benzene	ug/l	34371	3.4	0.5
ethylene chloride	ug/l	34423	ND	0.5
ethyl Ethyl Ketone	ug/l	81595	ND	5.0
ethyl Isobutyl Ketone	ug/l	81596	ND	1.0
,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
etrachloroethene	ug/l	34475	ND	0.5
oluene	ug/l	34010	27.1	0.1
,1,1-Trichloroethane	ug/l	34506	ND	0.5
,1,2-Trichloroethane	ug/l	34511	ND	0.5
richloroethene	ug/l	39180	ND	0.5
richlorofluoromethane	ug/l	34488	ND	0.5
inyl chloride	ug/l	39175	ND	0.5
ylenes	ug/l	81551	7.0	0.1
cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 Trichloropropane	ug/l		ND	0.5

SES-SD
DLS-5/

Carl Spangenberg MAY 20 1985   Shirley Cheng MAY 20 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) F. Ardey	DATE OF REPORT: 5-16-85
SYSTEM NAME:		NUMBER: 05706
WELL NAME AND/OR NUMBER:	STATE WELL NUMBER:	
DESCRIPTION OF SAMPLING POINT: Janns 4897		
NAME OF SAMPLER: CW Spangenberg	SAMPLER EMPLOYED BY: DWP	
DATE/TIME SAMPLE COLLECTED: 5-1-85	DATE/TIME SAMPLE RECEIVED @ LAB: 5-1-85	DATE ANALYSES COMPLETED: 5-6-85
TEST METHODS: 624 GC/MS	Were all the constituents listed below quantified? Yes	

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	0.12	0.11
Bromodichloromethane	ug/l	32101	ND	0.15
Bromoform	ug/l	32104	ND	0.15
Bromomethane	ug/l	34413	ND	0.15
Carbon tetrachloride	ug/l	32102	ND	0.15
Chlorobenzene	ug/l	34301	ND	0.11
Chloroethane	ug/l	34311	ND	0.15
2-Chloroethylvinyl ether	ug/l	34576	ND	0.15
Chloroform	ug/l	32106	ND	0.15
Chloromethane	ug/l	34418	ND	0.15
bis (2-Chloroethyl) ether	ug/l	34273	ND	0.1
Dibromochloromethane	ug/l	32105	ND	1.10
1,2-Dichlorobenzene	ug/l	34536	ND	0.15
1,3-Dichlorobenzene	ug/l	34566	ND	0.15
1,4-Dichlorobenzene	ug/l	34571	ND	0.15
Dichlorodifluoromethane	ug/l	34668	ND	0.1
1,1-Dichloroethane	ug/l	34496	ND	0.15
1,2-Dichloroethane	ug/l	34531	ND	0.15
1,1-Dichloroethene	ug/l	34501	ND	0.12
trans-1,2-Dichloroethene	ug/l	34546	ND	0.15
1,2-Dichloropropane	ug/l	34541	ND	0.15
cis-1,3-Dichloropropene	ug/l	34704	ND	0.15

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ans-1,3-Dichloropropene	ug/1	34699	ND	0.15
yl benzene	ug/1	34371	ND	0.15
thylene chloride	ug/1	34423	<0.15	0.15
thyl Ethyl Ketone	ug/1	81595	ND	1.10
thyl Isobutyl Ketone	ug/1	81596	ND	1.10
1,2,2-Tetrachloroethane	ug/1	34516	ND	0.15
trachloroethene	ug/1	34475	ND	0.15
luene	ug/1	34010	ND	0.11
1,1-Trichloroethane	ug/1	34506	ND	0.15
1,2-Trichloroethane	ug/1	34511	ND	0.15
ichloroethene	ug/1	39180	ND	0.15
ichlorofluoromethane	ug/1	34488	ND	0.15
nyl chloride	ug/1	39175	ND	0.15
lenes	ug/1	81551	ND	0.11

Note any unidentified peaks below .

hloropicrin	ug/l	ND	5.0
DBCP	ug/l	ND	5.0
1,2,3 Trichloropropane	ug/l	ND	0.5
cis 1, 2 dichloroethene	ug/l	ND	0.5

SE SD
DLB-5/84

C. J. ROGERS
JUL 10 1985

WATER QUALITY DIVISION
LAB REPORT OF ANALYSIS

Results in mg/l unless otherwise indicated

Sample No	Date Taken	Date Rec'd	Collector	Description
5-1322	5-1-85	5-1-85	CWS	Janns Well (4897)
5-1323	"	"	"	McBride 11 (4898)

[illegible]
JUL 10 1985

Sample No.	Date Anal	5-1322	Date Anal	5-1323	Date Anal		Date Anal		Date Anal		Date Anal	
Temperature °C Field												
Temperature °C Lab	5/1	24		24								
Turbidity (NTU Units)	5/1	36		0.8								
Color (Apparent Units)	5/1 W	70+		3								
Odor (Threshold)		Ep 2.0		Ch 1.4								
pH (Field)												
pH (Lab)	5/1	7.3		7.3								
Specific Elect. Cond.	5/1	[illegible]87		70[illegible]								
DO (Lab)	5/1	2.1		4.8								
DO (Field)												
BOD_5	5/6	6.6		5.0								
COD	5/7	13.		23								
SOC	[illegible]	1.3	[illegible]	1.1								
Alkalinity												
Total Alkalinity (as $CaCO_3$)	5/1	220		320								
Hydroxide (as $CaCO_3$)	5/1	0		0								
Carbonate (as $CaCO_3$)	5/1	0		0								
Bicarbonate (as $CaCO_3$)	5/1	220		320								
Chloride (Cl)	5/1	[illegible]		[illegible]								
Sulfate (SO_4)	5/2	23	[illegible]	[illegible]								
Phosphate (P)	[illegible]	0.05	[illegible]	0.08								
Nitrate (N)	5/6	0.12	5/1	0.83								
Nitrite (N)	5/1	.004		.003								
Ammonia (N)	5/1	.22		.01								
Total Kjeldahl Nitrogen (N)	W	.38		.08								
Surfactants (MBAS)	5/2	<.05	[illegible]	<.05								
Sodium (Na)	[illegible]	18	[illegible]	37								
Calcium (Ca)	[illegible]	[illegible]		[illegible]								
Magnesium (Mg)	[illegible]	17		7.1								
Potassium (K)	[illegible]	3.2	[illegible]	5.4								

~~R. K. KURIMATO~~
JUL 10 1985

REMARKS: Return Results to Carl Spangenberg

FORM [illegible] WS-7M Rev. 3/81

CHECKED BY

O. J. ROGERS
MAY 30 1986

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality

REPORT PREPARED BY: (SIGNATURE) Je Bordey

DATE OF REPORT: 5-28-8

NUMBER: 051017

SYSTEM NAME:

WELL NAME AND/OR NUMBER:

STATE WELL NUMBER:

DESCRIPTION OF SAMPLING POINT: Wicki Well

NAME OF SAMPLER: JGD

SAMPLER EMPLOYED BY: DWP

DATE/TIME SAMPLE COLLECTED: 5-7-86

DATE/TIME SAMPLE RECEIVED @ LAB: 5-7-86

DATE ANALYSES COMPLETED: 5-9-86

Were all the constituents listed below quantified? yes

TEST METHODS: 624 GC/MS

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	0.3	0.1
Bromodichloromethane	ug/l	32101	ND	0.5
Bromoform	ug/l	32104	ND	0.5
Bromomethane	ug/l	34413	ND	0.5
Carbon tetrachloride	ug/l	32102	ND	0.5
Chlorobenzene	ug/l	34301	ND	0.1
Chloroethane	ug/l	34311	ND	0.5
2-Chloroethylvinyl ether	ug/l	34576	ND	0.5
Chloroform	ug/l	32106	ND	0.5
Chloromethane	ug/l	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/l	34273	ND	5.0
Dibromochloromethane	ug/l	32105	ND	0.5
1,2-Dichlorobenzene	ug/l	34536	ND	0.5
1,3-Dichlorobenzene	ug/l	34566	ND	0.5
1,4-Dichlorobenzene	ug/l	34571	4.2	0.5
Dichlorodifluoromethane	ug/l	34668	ND	2.0
1,1-Dichloroethane	ug/l	34496	ND	0.5
1,2-Dichloroethane	ug/l	34531	ND	0.5
1,1-Dichloroethene	ug/l	34501	ND	0.2
trans-1,2-Dichloroethene	ug/l	34546	ND	0.5
1,2-Dichloropropane	ug/l	34541	ND	0.5
cis-1,3-Dichloropropene	ug/l	34704	ND	0.5

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
trans-1,3-Dichloropropene	ug/l	34699	ND	0.5
Ethyl benzene	ug/l	34371	ND	0.5
Methylene chloride	ug/l	34423	ND	0.5
Methyl Ethyl Ketone	ug/l	81595	ND	5.0
Methyl Isobutyl Ketone	ug/l	81596	ND	1.0
1,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
Tetrachloroethene	ug/l	34475	ND	0.5
Toluene	ug/l	34010	ND	0.1
1,1,1-Trichloroethane	ug/l	34506	ND	0.5
1,1,2-Trichloroethane	ug/l	34511	ND	0.5
Trichloroethene	ug/l	39180	ND	0.5
Trichlorofluoromethane	ug/l	34488	ND	0.5
Vinyl chloride	ug/l	39175	ND	0.5
Xylenes	ug/l	81551	ND	0.1
Cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 trichloropropane	ug/l		ND	0.5

JEFF DOBROWOLSKI
MAR 31 1986

O. J. ROGERS
MAR 26 1986

3-28-86
MAR 26 1986
Shirley Cheng

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality
REPORT PREPARED BY: (SIGNATURE) [signature]
DATE OF REPORT: 3-24-86
NUMBER: 05838
SYSTEM NAME:
STATE WELL NUMBER:
WELL NAME AND/OR NUMBER:
DESCRIPTION OF SAMPLING POINT: Wicks Well 4897A
NAME OF SAMPLER: JGD
SAMPLER EMPLOYED BY: DWP
DATE/TIME SAMPLE COLLECTED: 3-11-86
DATE/TIME SAMPLE RECEIVED @ LAB: 3-11-86
DATE ANALYSES COMPLETED: 3-17-86
Were all the constituents listed below quantified? yes
TEST METHODS: 624 GC/MS

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	0.7	0.1
Bromodichloromethane	ug/l	32101	ND	0.5
Bromoform	ug/l	32104	0.8	0.5
Bromomethane	ug/l	34413	ND	0.5
Carbon tetrachloride	ug/l	32102	ND	0.5
Chlorobenzene	ug/l	34301	0.2	0.1
Chloroethane	ug/l	34311	ND	0.5
2-Chloroethylvinyl ether	ug/l	34576	ND	0.5
Chloroform	ug/l	32106	ND	0.5
Chloromethane	ug/l	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/l	34273	ND	5.0
Dibromochloromethane	ug/l	32105	ND	0.5
1,2-Dichlorobenzene	ug/l	34536	1.0	0.5
1,3-Dichlorobenzene	ug/l	34566	ND	0.5
1,4-Dichlorobenzene	ug/l	34571	7.5	0.5
Dichlorodifluoromethane	ug/l	34668	ND	2.0
1,1-Dichloroethane	ug/l	34496	ND	0.5
1,2-Dichloroethane	ug/l	34531	ND	0.5
1,1-Dichloroethene	ug/l	34501	ND	0.2
trans-1,2-Dichloroethene	ug/l	34546	ND	0.5
1,2-Dichloropropane	ug/l	34541	ND	0.5
cis-1,3-Dichloropropene	ug/l	34704	ND	0.5

PURGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
trans-1,3-Dichloropropene	ug/l	34699	ND	0.5
Ethyl benzene	ug/l	34371	ND	0.5
Methylene chloride	ug/l	34423	ND	0.5
Methyl Ethyl Ketone	ug/l	81595	ND	5.0
Methyl Isobutyl Ketone	ug/l	81596	ND	1.0
1,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
Tetrachloroethene	ug/l	34475	ND	0.5
Toluene	ug/l	34010	ND	0.1
1,1,1-Trichloroethane	ug/l	34506	ND	0.5
1,1,2-Trichloroethane	ug/l	34511	0.6	0.5
Trichloroethene	ug/l	39180	ND	0.5
Trichlorofluoromethane	ug/l	34488	ND	0.5
Vinyl chloride	ug/l	39175	ND	0.5
Xylenes	ug/l	81551	ND	0.1
Cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 Trichloropropane	ug/l		ND	0.5

JAN 0 9 1985

O. U. ROGERS
JAN 0 7 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ABORATORY AME: DWP- Water Quality
REPORT PREPARED BY: (SIGNATURE) F J Bradley
DATE OF REPORT: 12-18-84
YSTEM AME:
NUMBER: 05415
ELL NAME ND/OR NUMBER:
STATE WELL NUMBER:
ESCRIPTION OF AMPLING POINT: Wicks well 4897A
AME OF AMPLER: C W Spangenberg
SAMPLER EMPLOYED BY: DWP
ATE/TIME AMPLE COLLECTED: 12-12-84
DATE/TIME SAMPLE RECEIVED @ LAB: 12-12-84
DATE ANALYSES COMPLETED: 12-13-84
EST METHODS: GC/MS
Were all the constituents listed below quantified? Yes

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
enzene	ug/l	34030	<1.0	
romodichloromethane	ug/l	~~33101~~ 32101	ND	
romoform	ug/l	32104	ND	
romomethane	ug/l	34413	ND	
arbon tetrachloride	ug/l	32102	ND	
hlorobenzene	ug/l	34301	<1.0	
hloroethane	ug/l	34311	ND	
-Chloroethylvinyl ether	ug/l	34576	ND	
hloroform	ug/l	32106	ND	
hloromethane	ug/l	34418	ND	
is (2-Chloroethyl) ether	ug/l	34273	ND	
ibromochloromethane	ug/l	32105	ND	
,2-Dichlorobenzene	ug/l	34536	<1.0	
,3-Dichlorobenzene	ug/l	34566	ND	
,4-Dichlorobenzene	ug/l	34571	9.1	
ichlorodifluoromethane	ug/l	34668	ND	
,1-Dichloroethane	ug/l	34496	ND	
,2-Dichloroethane	ug/l	34531	ND	
,1-Dichloroethene	ug/l	34501	ND	
rans-1,2-Dichloroethene	ug/l	34546	ND	
,2-chloropropane	ug/l	34541	ND	
-1,3-Dichloropropene	ug/l	34704	ND	

CEARLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ns-1,3-Dichloropropene	ug/l	34699	ND	
yl(nzene	ug/l	34371	ND	
hylene chloride	ug/l	34423	<1.	
hyl Ethyl Ketone	ug/l	81595	ND	
hyl Isobutyl Ketone	ug/l	81596	ND	
l,2,2-Tetrachloroethane	ug/l	34516	ND	
trachloroethene	ug/l	34475	ND	
luene	ug/l	34010	ND	
1,1-Trichloroethane	ug/l	34506	ND	
1,2-Trichloroethane	ug/l	34511	ND	
ichloroethene	ug/l	39180	ND	
ichlorofluoromethane	ug/l	34488	ND	
nyl chloride	ug/l	39175	ND	
lenes	ug/l	81551	<1.	

Note any unidentified peaks below

GAS ANALYSIS

Parts Per Million (v/v)

Compound	Hewitt
Ethane	11.6
Ethylene	6.1
Propane	4.4
Propylene	4.7
iso-Butane	1.6
n-Butane	TR<1
Butenes	2.1
iso-Pentane	TR<1
n-Pentane	TR<1
Pentenes	ND<1
Hexanes	TR<1
Heptanes	9.2
Benzene	2.7
Toluene	9.5
Vinyl Chloride	2.0
Trichloroethylene	1.7
Perchloroethylene	2.9

ND - This compound was not detected; the limit of detection for this analysis is less than the amount stated in the table above.

TR - Trace, this compound was present, but was below the level at which concentration could be determined.

APPENDIX C

WELL COMPLETION REPORTS

LAW ENVIRONMENTAL, INC.

3420 N. SAN FERNANDO BLVD.
SUITE 200
BURBANK, CALIFORNIA 91504
818-848-0214
PANAFAX 818-848-1674

December 30, 1987

Cal Mat Properties
3200 San Fernando Road
Los Angeles, California 90065

Project No. 58-7057

Attention: Mr. George Cosby

Gentlemen:

Completion Report
Construction of Second Downgradient
Monitoring Well - Hewitt Landfill
Los Angeles, California

The completion report for the new Second Downgradient Monitoring Well for Hewitt Landfill is attached. This well was installed as part of the landfill SWAT program. The report includes construction details, and a description of materials encountered.

If you have any questions regarding this information, please do not hesitate to contact us.

Yours very truly,

LAW ENVIRONMENTAL, INC.

Vincent A. Richards

by
Vincent Richards
Staff Geologist

by Glenn A. Brown
Glenn A. Brown, C.E.G. 3
Senior Vice President

COMPLETION REPORT

CONSTRUCTION OF SECOND DOWNGRADIENT MONITORING WELL

HEWITT LANDFILL

LOS ANGELES, CALIFORNIA

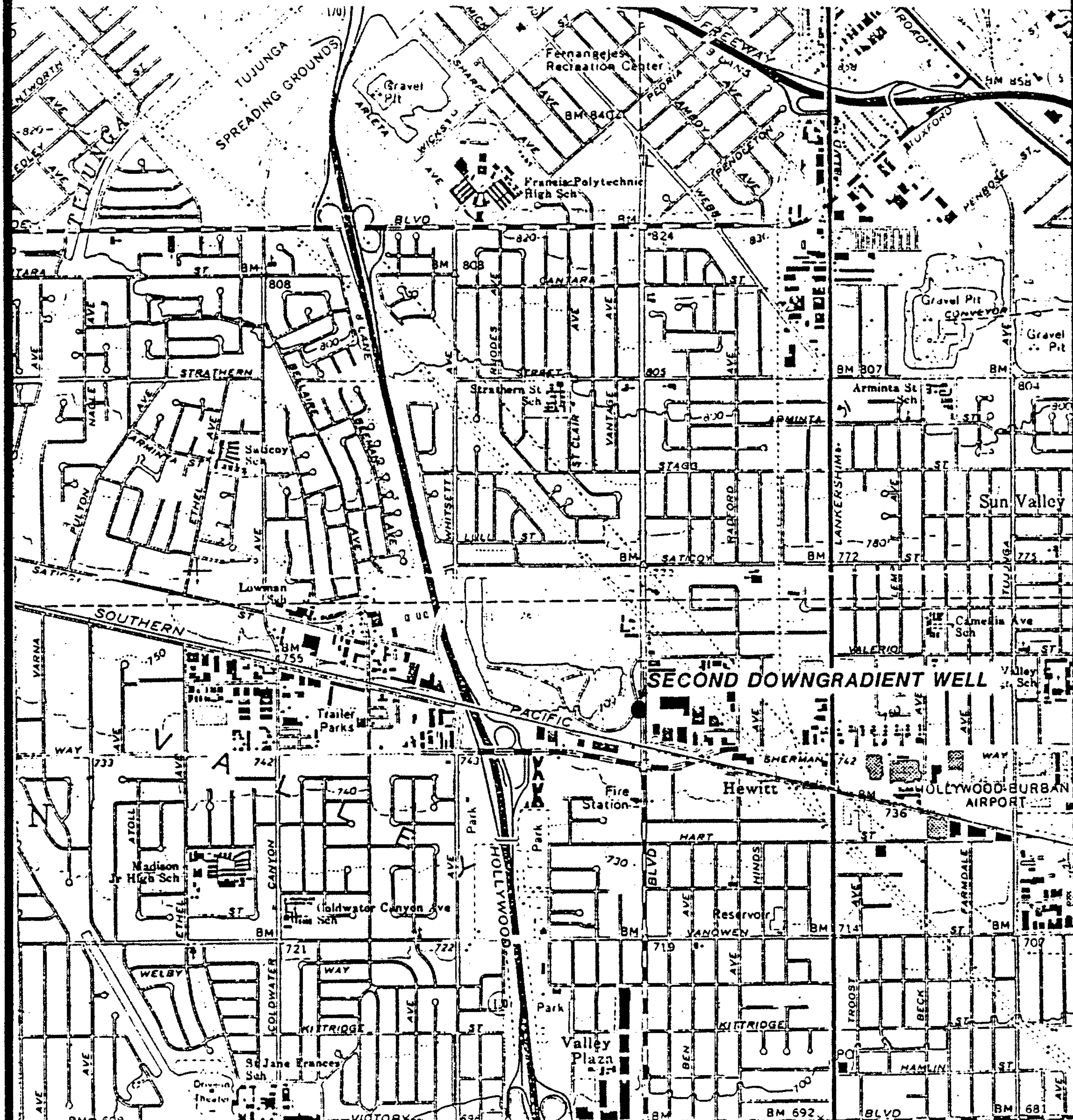
Project No. 58-7057

INTRODUCTION

This report describes the construction of CalMat Company's Second Downgradient Well at the Hewitt Landfill. The well is located in the North Hollywood District of Los Angeles, California, 800 feet north of the northwest corner of Sherman Way and Laurel Canyon Boulevard (see Figure 1).

Well drilling, casing construction, and development of the Second Downgradient Well was provided by Howard Pump, Inc. of Barstow, California. Geophysical logging of the borehole was provided by Welenco, Inc. of Bakersfield, California. Logging of the alluvial materials penetrated, documentation of construction practices, well design, and testing were provided by Law Environmental, Inc. of Burbank, California. All work related to well design and construction supervision was carried out in accordance with verbal authorization from Mr. George Cosby.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geologist practicing in this or similar localities. No other warranty, expressed or implied is made as to the professional advice included in this report.



REFERENCE: BASE MAP FROM U.S.G.S
7½' VAN NUYS QUADRANGLE, 1972

N

WELL LOCATION MAP

SECOND DOWNGRADIENT WELL
HEWITT LANDFILL

SCALE 1"=2000'

FIGURE 1

LAW ENVIRONMENTAL, INC.

JOB ____ DATE ____ DR. ____ E. ____ W.P. ____ CHKD ____

FORM 1

HYDROGEOLOGIC CONDITIONS

The lithologic log of the well is presented in Appendix A. The material penetrated by the boring consists of Pleistocene alluvial material derived from San Gabriel Mountains to the north. The alluvial material is predominantly sand and sandy gravel with numerous cobble zones and occasional interbeds of clay and silt. The clay and silt layers became more prominent below 280 feet. The lithologic log indicates that the alluvial materials beneath the site are highly permeable. Ground water was encountered below 250 feet in unconfined conditions.

WELL CONSTRUCTION

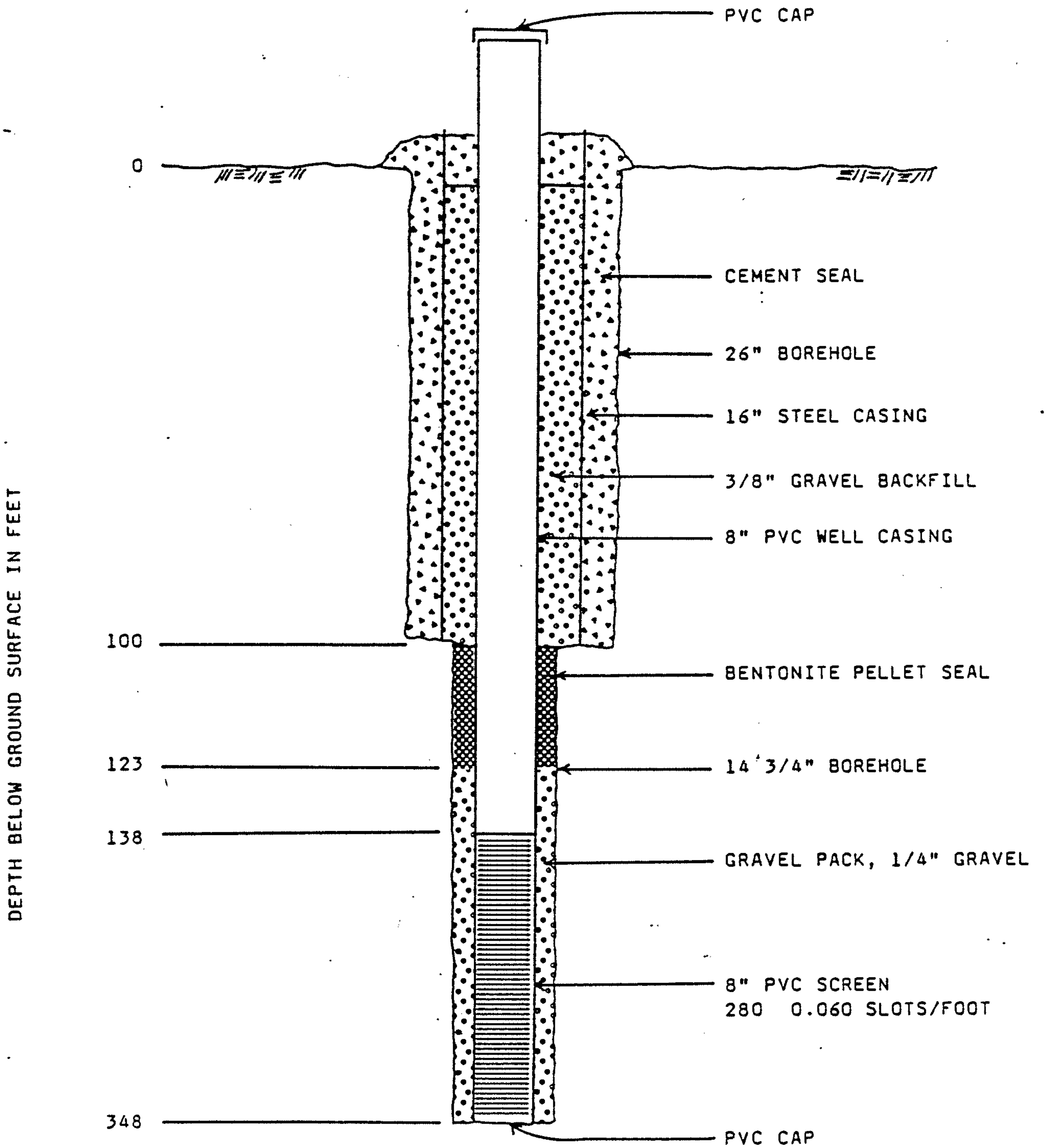
Drilling commenced on November 23, 1987 using a conventional rotary mud method and bentonite drilling mud to stabilize the borehole and remove drill cuttings.

On November 25, 1987, a 9-7/8-inch-diameter pilot hole was drilled to a final depth of 348 feet, and geophysical logging of the borehole was performed (Appendix B). Based on review of the lithologic, gamma-ray, and electric logs, a final well design was completed.

On December 1, 1987, a 26-inch conductor borehole was drilled to a total depth of 100 feet. A 16-inch-diameter conductor was set in the borehole and cemented into place. On December 4, 1987, the well borehole was reamed to a 14-3/4-inch diameter and a total depth of 348 feet below ground surface on December 4, 1987. On December 7, the drilling mud in the borehole was thinned and 8-inch PVC casing and screen placed to the bottom of the borehole. Schedule 80 PVC slotted casing, 280 0.060-inch slots/foot, was set between the depths of 138 feet and 348 feet. Well construction details are presented on Figures 2 and 3. The annular space between the borehole and well screen was filled by 1/4-inch crushed gravel using a Bobcat loader. The gravel pack was placed to 123 feet below ground surface and covered with bentonite pellets, which filled the borehole to the bottom of the conductor casing. The remainder of the borehole was filled with 3/8-inch gravel to the surface.

WELL DEVELOPMENT

Well development was conducted in two separate phases. On December 9 and 10, the well was bailed using a 6-inch bailer for a total time of eight hours. Partial clearing of the water was observed. On December 16, the well was partially developed using a 6-inch turbine pump set at 300 feet. Development consisted of surging the well by the on-off action of the pump. Discharge



NOT TO SCALE

WELL CONSTRUCTION DETAIL

SECOND DOWNGRADIENT WELL

FIGURE 2

LAW ENVIRONMENTAL, INC.

JOB ____ DATE ____ DR. ____ O.E. ____ W.P. ____ CHKD ____

FORM

MONITORING WELL CONSTRUCTION DETAILS
WELL NO. - SECOND DOWNGRADIENT WELL

JOB NAME CAL MAT PROPERTIES Job No. 58-7057
Date Construction Commenced 11-23-87 Completed 12-7-87
Drilling Contractor Howard Pump
Supervision By Vince Richards - STEVE McArdle Signature

WELL LOCATION
State CALIFORNIA County LOS ANGELES City
Coordinates

BOREHOLE DRILLING
Conductor Borehole: Depth 100 feet Diameter 26 inches
Drilling Method ROTARY Drilling Fluid BENTONITE + FRESH WATER
Well Borehole: Depth ~~352~~ 348 feet Diameter 14 3/4 inches
Drilling Method ROTARY Drilling Fluid BENTONITE + FRESH WATER

WELL CONSTRUCTION
Conductor Casing Material STEEL ASTM
Length 100 feet ID 16 inches Wall .25 inches
Well Casing Materials SCHEDULE 80 PVC FLUSH THREADED ASTM
Length 138 feet ID 8 inches Wall inches
Well Screen Type ~~SCHEDULE 80 PVC~~ 0.060" SLOTS FLUSH THREADED
Material PVC SCHEDULE 80 ASTM
Length ~~200~~ 210 feet ID 8 inches Wall inches
Slots/foot 280 Length inches Width inches
Filter Pack Material 1/4" CRUSHED GRAVEL Sieve Sizes 4x20
Placement Method DUMP
Sealant Materials BENTONITE PELLETS Volume 19 cu. feet
Volume cu. feet
Placement Method GRAVITY
Protective Well Cap Type PVC CAP
Well Development Procedure BAILING + ~~PUMP~~ TURBINE PUMPING
Duration 12 hours Volume Pumped 40,000 gallons

WELL TESTING
Date of Test 12/17/87 Type CONSTANT DISCHARGE Duration 2.5 hours
Discharge Rate 200 gpm Pumping Water Level ~~250.3~~ 253.5 feet
Specific Capacity 167 gpm/ft Static Water Level 252.3 feet
Sand Content <1 mg/l Drawdown 1.2 feet
Turbidity CLEAR Odors NONE
Elec. Conductance micromhos/cm pH Temperature 60 °C

REFERENCE ELEVATIONS
Surface Elevation feet Top of Casing Elevation feet
Reference Point Elevation for Water Level Measurements feet
Description of Reference Point

REMARK

FIGURE 3

ranged from 50 to 220 gpm. During the discharge period, no visual turbidity was noted.

AQUIFER TESTING

On December 17, a short aquifer test was made on the well. Using the 6-inch turbine pump set at 300 feet, a constant discharge of 200 gpm was held for 2.5 hours. Drawdown was measured by use of an air line and pressure gauge. A summary of these measurements and test data are included in Appendix C.

The available field data from the pump test on the well indicates a transmissivity of 44,000 gpd/ft and an approximate permeability of 4.6 x 10^2 g/ft^2/d. Calculations are shown in Appendix D.

CURRENT STATUS

On December 18, 1987, the turbine pump was withdrawn from the well, and the well is now awaiting permanent installation of a monitoring pump.

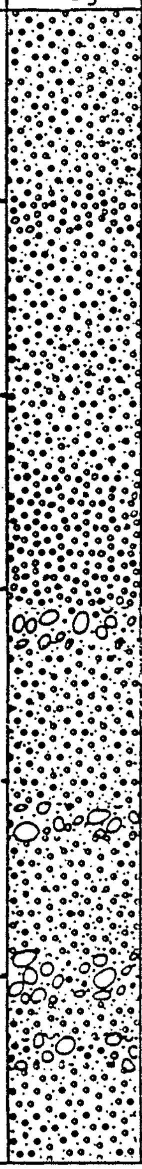
APPENDIX A

LITHOLOGIC LOG

LITHOLOGIC LOG

Owner: CalMat Properties | Well No. Second Downgradient
Drilled by: Howard Pumps | USGS No.
Location: CalMat Storage Yard, 800' North of the NW corner of Sherman Wy. and Laurel Cny.

Drilling method: Mud Rotary | Date completed: 12-7-87
Borehole depth: 348 Ft. | Borehole diameter: 14 3/4 inches
Casing: PVC Sch. 80, 2 Ft. above ground to 133 Ft.
Perforations: PVC Sch. 80 w/280 0.060 slots/foot 138-348 Ft.
Static water level: 252.3 Ft. | Drawdown: 1.2 Ft. Yield: 200 gpm
Specific capacity: 167 gpm/ft | Electrical conductance: micromhos
Ground elevation: | Top of casing elevation:

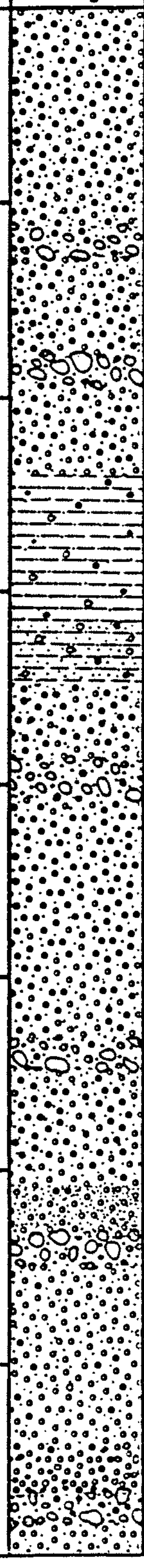


Depth	Graphic Log	Description of Materials	
0		SAND & GRAVEL	Predominantly grey to brown fine to coarse grained sand with varing amounts of quartz rich gravel and approximately 5% micaceous silt
20			Increasing gravel 30% and coarse grained sand
40			
			At 50' 80% pea gravel, predominantly quartz diorite and granite
60			Chatter
			Brown to tan sand with gravel
80			Chatter
100			Chatter
			Sand grain size decreasing, with silt increasing
			Chatter
			Sand increasing
120			

Remarks: Conductor casing: 16 inch diameter steel casing 0-100 feet

LITHOLOGIC LOG

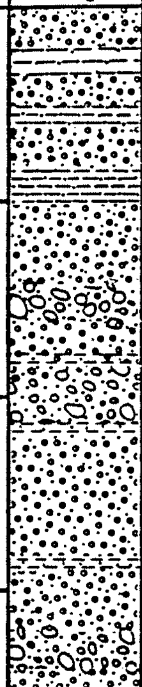
Second Downgraient
Well No. Well



Depth	Graphic Log		Description of Materials
120			
			Fine to medium sand
140			
			Chatter
			Chatter
160			
		SILTY CLAY	Brown silty clay with a small amount of fine to coarse grained sand and gravel. Some plasticity, sand increasing with depth
180			
		SAND & GRAVEL	Brown to grey, fine to coarse grained sand with varying amounts of gravel
200			Chatter
220			
			Chatter
240			
			Sandier
			Chatter
260			
			Increasing gravel content Chatter
280			

LITHOLOGIC LOG

Second Downgradient
Well No. Well

Depth	Graphic Log	Description of Materials	
280		SANDY CLAY to CLAYEY SAND	Brown sandy clay and clayey sand with gravel and occasional cobbles, clay increasing with depth
300		SAND & GRAVEL	Brown, fine to coarse grained sand with gravel, and occasional clay and cobble interbeds
			Chatter
320			Chatter
340			
			Chatter
			Total Depth - 348 Feet
360			

APPENDIX B

GEOPHYSICAL LOGS

2166-01286

welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO.

COMPANY HOWARD PUMP, INC. / LAW ENVIRONMENTAL, INC.

WELL HEWITT Second Down Gradient Well

FIELD NORTH HOLLYWOOD

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:
CAL MAT SELF STORAGE
A 33

SEC. ______ TWP. ______ RGE. ______

OTHER SERVICES:
GAMMA-RAY

Permanent Datum: G.L., Elev. ______
Log Measured From G.L., ______ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ______
D.F. ______
G.L. ______

Date	11-25-87			
Run No.	ONE			
Depth—Driller	352'			
Depth—Logger	349'			
Btm. Log Inter.	348'			
Top Log Inter.	8'			
Casing—Driller	- @	@	@	@
Casing—Logger	-			
Bit Size	9-7/8"			
Type Fluid in Hole	BENTONITE & POLYMER MUD			
	-			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD DITCH			
R_m @ Meas. Temp.	12.5 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	13.3 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	1.5 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	CU-1 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. MC ARDLE			

Fold Here

This Heading and Log Conform To API RP 31

REMARKS

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other
ONE	ELECTRIC LOG		FREE	

Changes in Mud Type or Additional Samples

Date | Sample No.		
Depth—Driller		
Type Fluid in Hole		
Dens. | Visc.		
ph | Fluid Loss	ml	ml
Source of Sample		
R_m @ Meas. Temp.	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F
Source: R_{mf} | R_{mc}		
R_m @ BHT	@ °F	@ °F
R_{mf} @ BHT	@ °F	@ °F
R_{mc} @ BHT	@ °F	@ °F

RESISTIVITY ohms. m²/m

RESISTANCE Detail Curve

RESISTIVITY ohms. m²/m

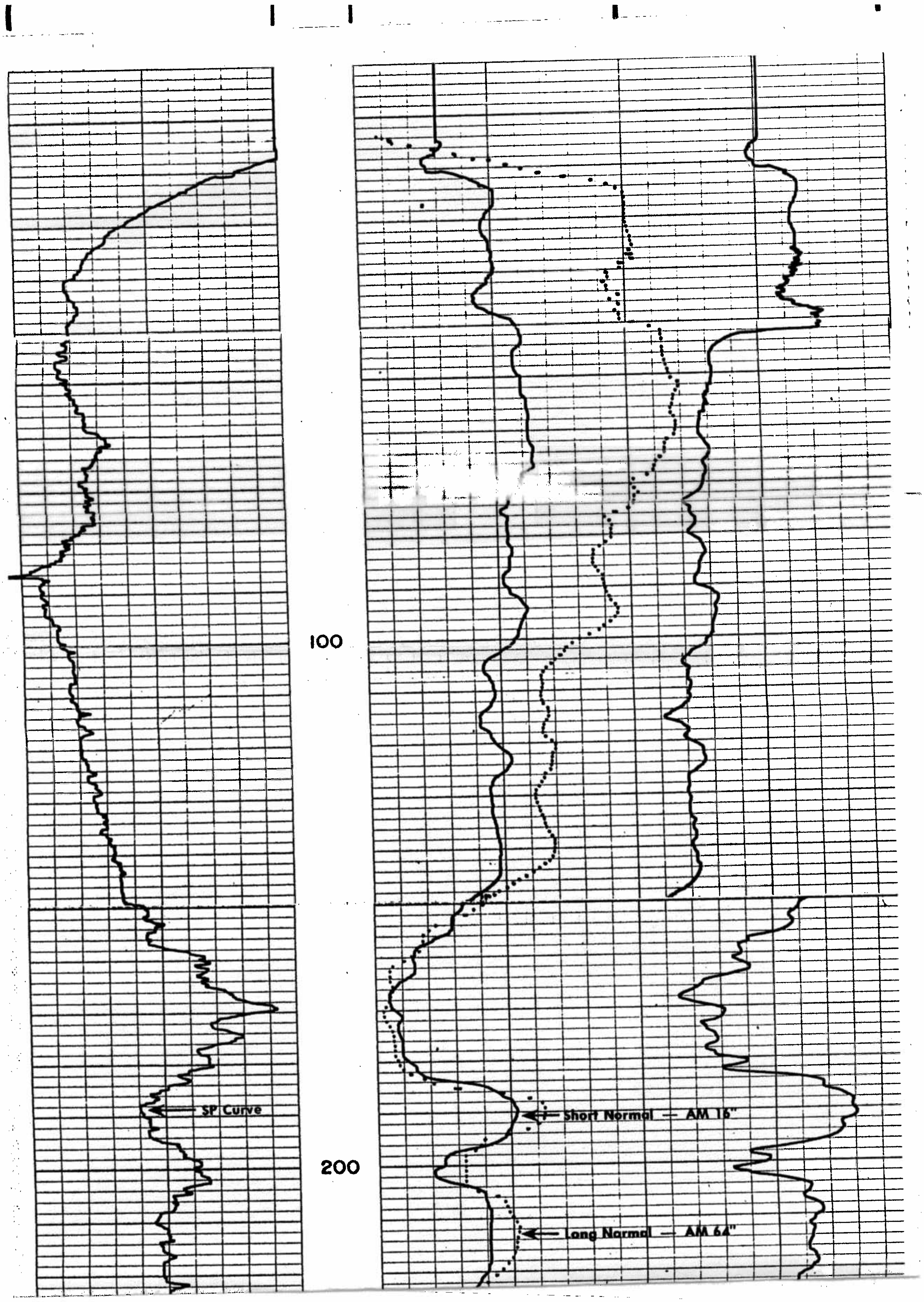
SHORT NORMAL 16 Inch 0 500

LONG NORMAL 64 Inch 0 500

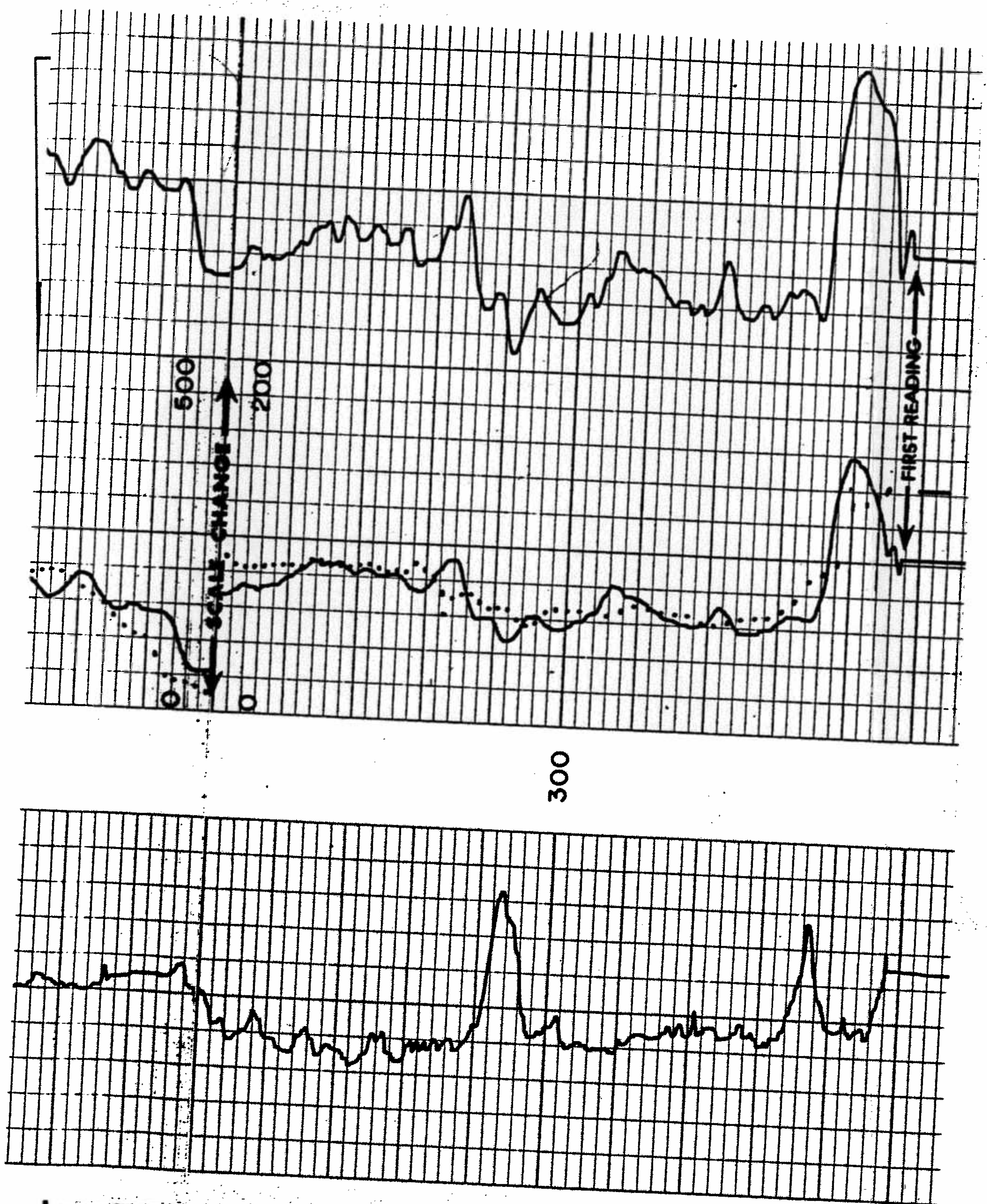
Depths

SPONTANEOUS POTENTIAL millivolts

\- 5 +



SP Curve
Short Normal — AM 16"
Long Normal — AM 64"
100
200



Recorded By	D.L. CRAIG
Witnessed By	MR. MC ARDLE

APPENDIX C

WELL TEST DATA

Sheet 1 of 1

WELL TEST DATA

Project No.: 58-7057

Date of Test: 12/17/87

Well No.: SECOND DOWNGRADIENT WELL

Static Water Level: 252.3 feet

Time	t	t'	t/t'	h	h'	Q	Remarks
	0			252.3			Turn on Pump
	0.5			252.3	0	200	Clear water
	1			252.3	0		
	2			253.5	1.2		
	3			253.5	1.2		
	4			253.5	1.2		
	5			253.5	1.2		
	6			253.5	1.2		
	7			253.5	1.2		
	8			253.5	1.2		
	9			253.5	1.2		
	10			253.5	1.2		
	16			253.5	1.2		
	22			253.5	1.2		
	30			253.5	1.2		
	35			253.5	1.2		
	40			253.5	1.2		
	45			253.5	1.2		
	50			253.5	1.2		
	55			253.5	1.2		
	60			253.5	1.2		T = 60°F
	70			253.5	1.2		
	80			253.5	1.2		
	90			253.5	1.2		
	100			253.5	1.2		clear water
	110			253.5	1.2		
	120			253.5	1.2		
	130			253.5	1.2	200	
	150			253.5	1.2		SHUT PUMP OFF

APPENDIX D

PERMEABILITY CALCULATIONS

LAW ENVIRONMENTAL, INC.
3420 NORTH SAN FERNANDO BLVD.
SUITE 200
BURBANK, CA 91504-2569
818-848-0214

JOB NO. 58-7057 SHEET 1 OF 1
JOB NAME
BY DATE
CHECKED BY DATE

$$T = \frac{1440\,Q}{\Delta S}$$

$\Delta S = 1.2$

$Q = 200\ g/min.$

$T = (1440)(200/1.2') = 240{,}000\ gal/ft/day$

$\div 7.48\ gal/CF = 32{,}085\ ft^2/day$

$$K = \frac{T}{b}$$

$b = 252.3 - 348 = 95.7$ say $100'$

$K = 320.8\ ft/day$

$$V = \frac{Ki}{S_y \approx .20} = 320 \times \frac{20}{4600} / .20 = 6.97 \text{ say } 7$$

ft/day

COMPLETION REPORT
CONSTRUCTION OF UPGRADIENT MONITORING WELL NO. 1
HEWITT LANDFILL, NORTH HOLLYWOOD DISTRICT
LOS ANGELES COUNTY, CALIFORNIA
FOR
VALLEY RECLAMATION COMPANY

February 12, 1985

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby

Gentlemen:

Correction of Completion Report Dated 01-03-85
Construction of Upgradient Monitoring Well No. 1
Hewitt Landfill, North Hollywood District,
Los Angeles County, California, For Valley Reclamation

It has been called to our attention that there was an error on Page 5 of the subject completion report. The error has been corrected, and corrected copies of the page are enclosed for insertion in your report copies.

Please accept our apologies for this error and the resulting inconvenience.

Respectfully submitted,

LeROY CRANDALL AND ASSOCIATES

by Alice M Campbell
Alice M. Campbell, C.E.G. 1157
Senior Staff Geologist

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB:AC/jj6cc
Enclosures
(5 copies submitted)

cc: Los Angeles Regional Water Quality Control Board
Attn: Mr. Dick Harris
Los Angeles Department of Water and Power
Attn: Mr. Mel Blevins
Attn: Mr. Tom Gibson
Los Angeles Bureau of Sanitation
Attn: Ms. Sheila Molyneux

January 3, 1985

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby

Gentlemen:

Submitted herewith is our completion report for the new upgradient well. The report contains a description of well construction details and alluvial materials beneath the well site.

Respectifully Submitted,

LeROY CRANDALL AND ASSOCIATES

by *Alice M Campbell*
Alice M. Campbell, C.E.G. 1157
Senior Staff Geologist

by *Glenn A Brown*
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB:AC/jj4r
(5 copies submitted)

cc: Los Angeles Regional Water Quality Control Board
Attn: Mr. Dick Harris
Los Angeles Department of Water and Power
Attn: Mr. Mel Blevins
Attn: Mr. Tom Gibson
Los Angeles Bureau of Sanitation
Attn: Ms. Sheila Molyneux

COMPLETION REPORT

CONSTRUCTION OF UPGRADIENT MONITORING WELL NO. 1

HEWITT LANDFILL, NORTH HOLLYWOOD DISTRICT

LOS ANGELES COUNTY, CALIFORNIA

FOR

VALLEY RECLAMATION COMPANY

INTRODUCTION

This report describes the construction of the Hewitt Landfill upgradient Monitoring Well No. 1. The monitoring well is designed and located to allow measurement of ground water quality upgradient of the closed Hewitt Landfill facility, and to provide background water level data. The monitoring well is placed to allow detection of any ground water degradation from upgradient sources. Plate 1, Well Location Map, shows the location of the monitoring well with respect to the Hewitt site. The well is located in the southern parkway of the North Saticoy Street cul-de-sac, approximately 100 feet west of the Hollywood Freeway.

CHRONOLOGY OF WORK

All work pertaining to the location and construction of the well was carried out in accordance with the design details prepared for the well by our office. All work related to construction and development of the wells was conducted by Howard Pump Company of Barstow, California, under the observation of LeRoy Crandall and Associates. The work was carried out between October 29 and November 1, 1984.

WELL CONSTRUCTION AND DEVELOPMENT

The mud rotary drilling method was used to construct the monitoring well. The well was constructed by drilling a 12¼-inch borehole to design depth. An Electric Log of the well was made after borehole drilling and prior to casing installation. An 8-5/8 inch outer diameter steel casing was placed in the borehole. The well casing is perforated in the lower 160 feet with milled slots. The annular area of the borehole was backfilled with rounded, clean pea gravel (3/8-inch) to 10 feet above the perforations. A layer of bentonite pellets was installed over the gravel pack. The remaining annular area was sealed with a lean concrete mix from the top of the bentonite to ground surface. Table 1 contains pertinent well construction information. Plate 2, Well Construction Details, illustrates the construction details of the monitoring well. Appendix A contains the E-Log, Water Well Drillers Report and Test Pump Data.

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

MW No.	Ground Surface Elevation	Borehole Depth (ft.)	Casing* Depth (ft.)	Casing Perforated**		Gravel Packed		Sealed	
				From	To	From	To	From	To
1	769	290	290	120	280	110	290	0	110

NOTE: (*) All casing 8-5/8-inch O.D. steel casing. (**) Casing perforated with 3/32 x 2-1/2-inch milled slots, 18 slots per foot. (MW) Monitoring Well.

The well was developed by pumping at rates up to 100 gpm with an electric submersible pump. The well was pumped first for 6½ hours, and then for 30 hours. At the end of the development phase, water samples were collected. At the time of sampling, the water was clear.

HYDROGEOLOGIC CONDITIONS

Borehole drilling encountered alluvial sands and gravels with occasional boulders and fine grained layers, similar to those found throughout this part of the San Fernando Valley. Ground water was encountered at a depth of 213 feet, which corresponds to an elevation of 546 feet above sea level.

WATER QUALITY

General

The water samples collected at the end of the development period were immediately sent to Brown and Caldwell Laboratory in Pasadena, and by the Los Angeles Regional Water Quality Control Board to the State laboratory. The water samples were analyzed for volatile organic compounds and general mineral content. The results of both sets of analyses are in Appendix B. The general mineral quality of the water shows that it meets general drinking water standards for inorganic compounds. Excessive levels of trace organics, however, will require treatment to produce acceptable drinking water.

Inorganic

The following Table 2 shows the mineral quality objectives for the area of the Hewitt Landfill, and the results from the new monitoring well. The information is taken from the Regional Water Quality Control Board (RWQCB) Basin Plan (1975), Appendix C.

TABLE 2
MINERAL QUALITY OBJECTIVES FOR GROUND WATERS

	Objective (mg/l)			
San Fernando Subunit:	TDS	Sulfate	Chloride	Boron
North Hollywood-Burbank Area:	600	250	100	1.5
Monitoring Well Water Quality:				
Well No. 1	420	220	22	---

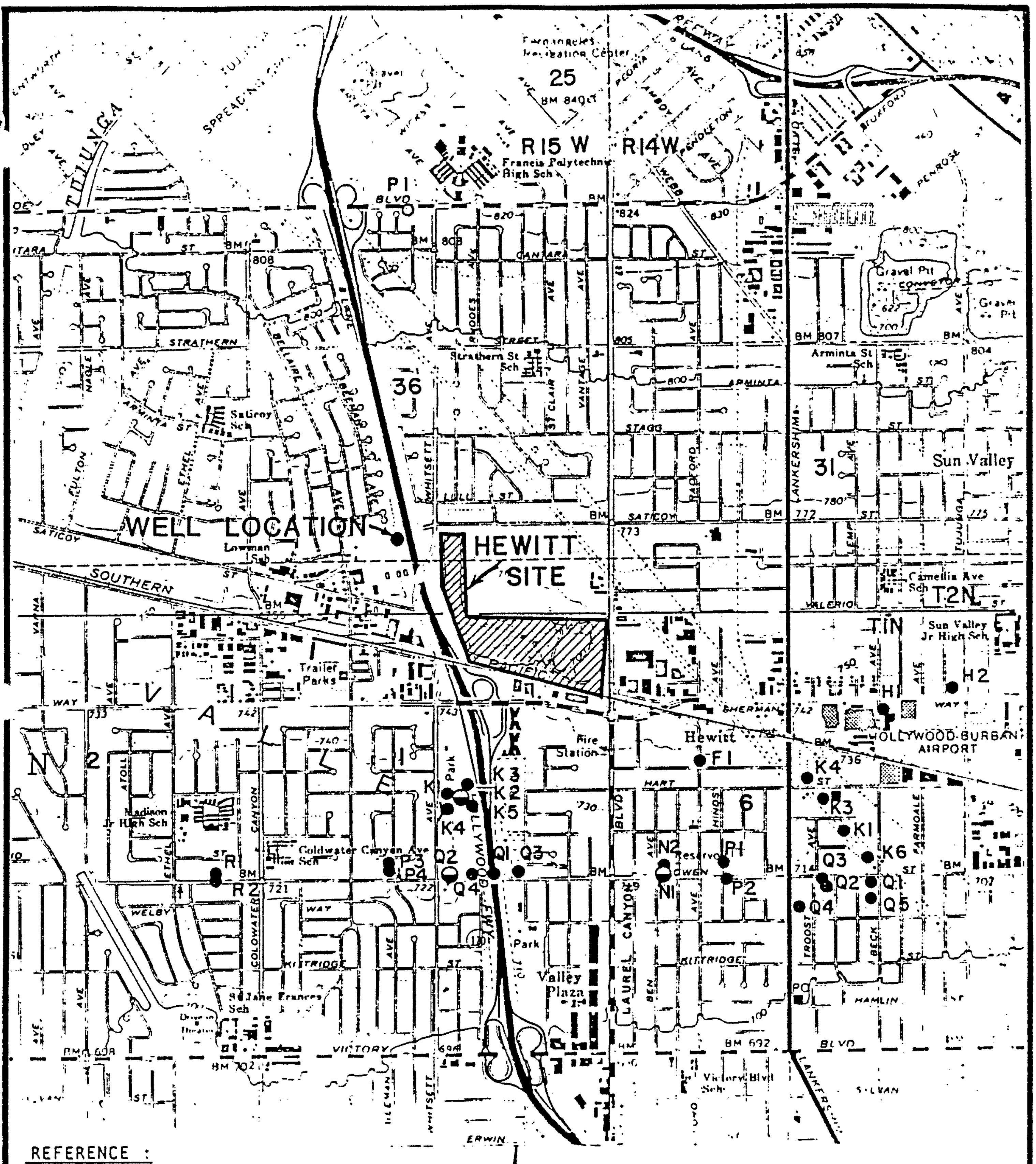
The general mineral quality in the vicinity of he Hewitt Landfill is within the RWQCB objectives. The water is a calcium bicarbonate type with high (300 ppm) total hardness. The pH is slightly alkaline and total dissolved solids are moderate.

Organic

The RWQCB has not yet established organic compound objectives for water in the San Fernando Valley. However, the EPA has made available water quality criteria for some toxic pollutants. At a 1 per million risk level, the EPA exposure estimates are shown in the following table.

TABLE 3
EPA WATER QUALITY CRITERIA - 45 FR 79318
(10^{-6} Risk Level)

TCE	2.7 ug/l
PCE	0.8 ug/l
Carbon Tetrachloride	0.40 ug/l
1, 2, DCA	0.94 ug/l



REFERENCE :

BASE MAP U.S.G.S. 7.5' QUADRANGLE
VAN NUYS 1966, PHOTOREVISED, 1972.

EXPLANATION :

● WELL

◓ WELL WITH HYDROGRAPH OR WATER QUALITY DATA

0 2000 4000
SCALE IN FEET

WELL LOCATION MAP

LeROY CRANDALL AND ASSOCIATES

PLATE I

JOB E 81001 DATE 12-8-82 DR. M.G. C.E. J.D. W.P. CHKD JO

FORM 120

The following are attached and complete this report.

TABLE 4
SUMMARY OF TCE AND PCE DATA
October, 1984
(ug/l)

	Brown and Caldwell	Department of Health Services
Well:	#1	#1
PCE	3	--
TCE	0	--
All Other	31	25

Using these figures as guidance, the ground water upgradient of the closed Hewitt Landfill could be considered marginally suitable for drinking without treatment.

In addition to the constituents already named, other compounds are present which indicate ground water contamination. These compounds include petroleum hydrocarbons, xylenes, benzene, and toluene. These compounds are found in gasoline and diesel fuel. The levels of these compounds vary from less than 1 ug/l to over 20 ug/l (total) in the new monitoring well.

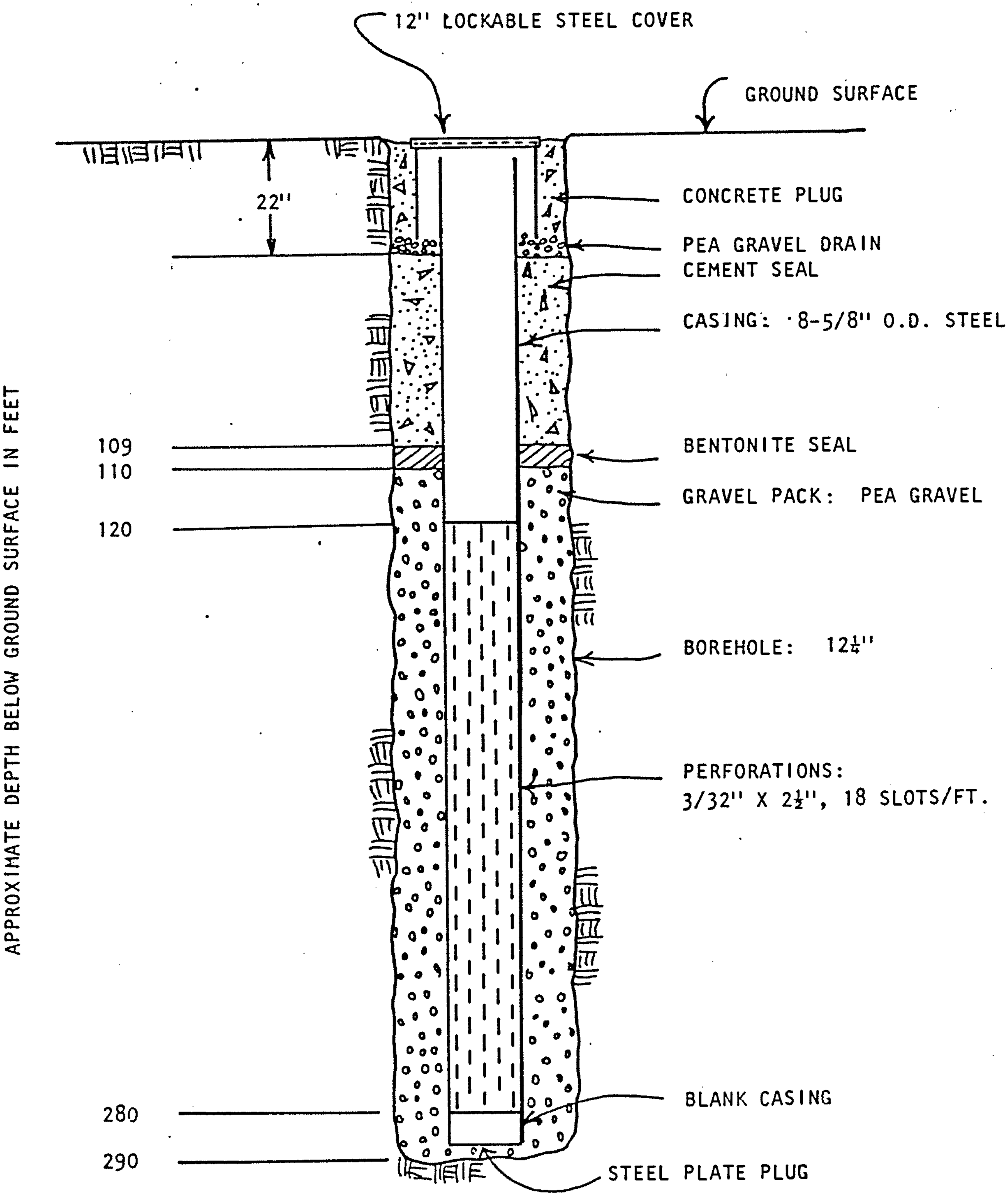
CONCLUSIONS

1) On the basis of our observation of well construction, the well was completed as designed. No unusual or unexpected geologic conditions were encountered during drilling. The well should, therefore, be suitable its intended purpose as a monitoring well.

2) Evidence of contamination of ground water was obtained from the well. The type of contamination indicates that the source is probably aged gasoline and industrial solvents, and that the sources are located upgradient of the Hewitt Landfill.

-oOo-

NOT TO SCALE



CONSTRUCTION DETAILS
HEWITT MONITORING WELL No.1

LeROY CRANDALL AND ASSOCIATES

PLATE 2

JOB E-81001 DATE 12-6-84 DR. C.E. W.P. CHKD

FORM 120

APPENDIX A

welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO

COMPANY Howard Pump, Inc

WELL Hewitt Upgradient

FIELD North Hollywood

STATE California COUNTY Los Angeles

LOCATION: Saticoy St. 30' W. of end. near Hollywood Fwy.

OTHER SERVICES None

SEC. ______ TWP ______ RGE ______

Permanent Datum: G.L. Elev. ______

Log Measured From G.L. Ft. Above Perm. Datum

Drilling Measured From G.L.

Elev.: K.B. ______ D.F. ______ G.L. ______

Date	10-31-84			
Run No.	ONE			
Depth—Driller	293'			
Depth—Logger	293'			
Btm. Log Inter.	292'			
Top Log Inter.	27'			
Casing—Driller	– @	@	@	@
Casing—Logger	–			
Bit Size	12¼"			
Type Fluid in Hole	MUD			
Dens. | Visc.	–			
pH | Fluid Loss	ml	ml	ml	ml
Source of Sample	CIRCULATED			
R_m @ Meas. Temp.	4.0 @ 88 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	6 HOURS			
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	FV | BFL			
Recorded By	D.L. CRAIG			
Witnessed By	H.S. CAMPBELL			

FIELD PRINT

This Heading and Log Conform To API RP 31

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

Equipment Data: Run No. | Tool Type | Pad Type | Tool Position | Other

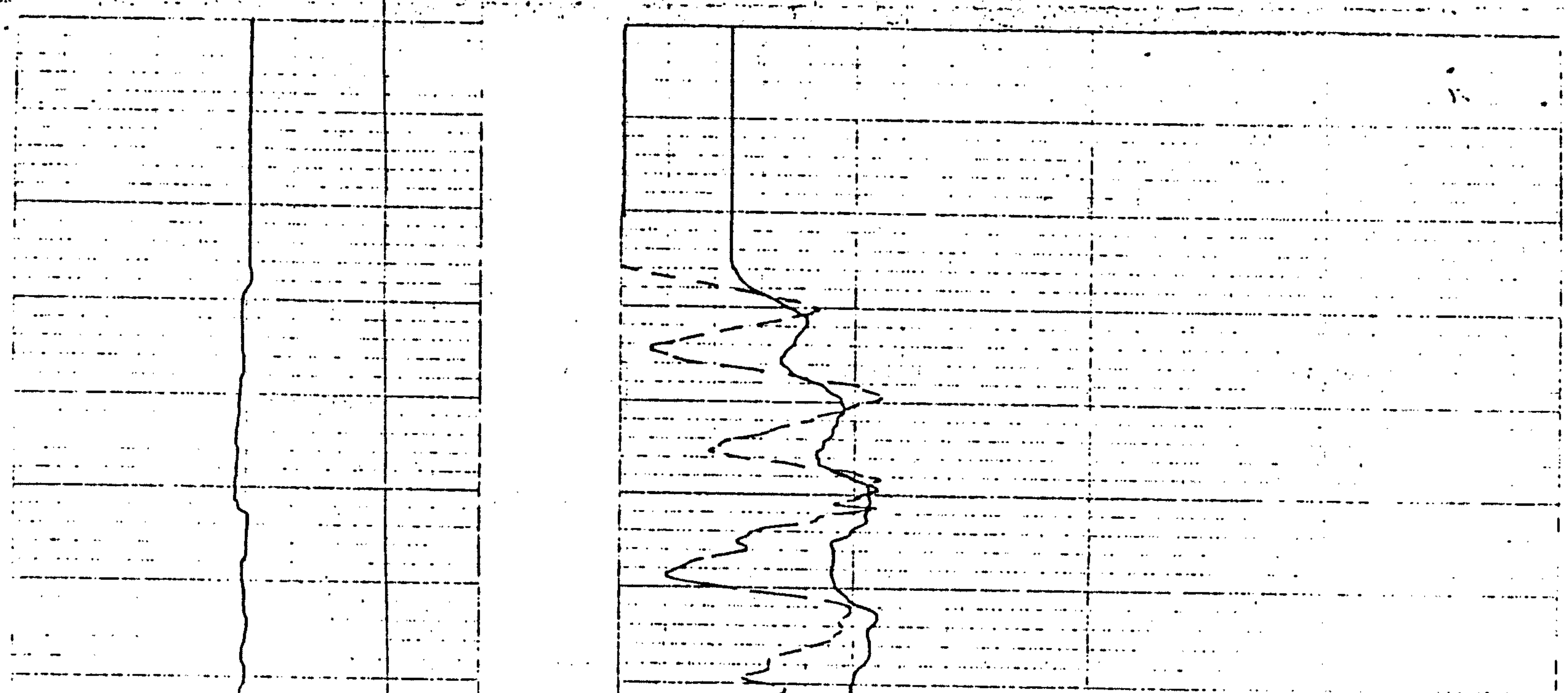
Run No. ONE | Tool Type ELECTRIC LOG

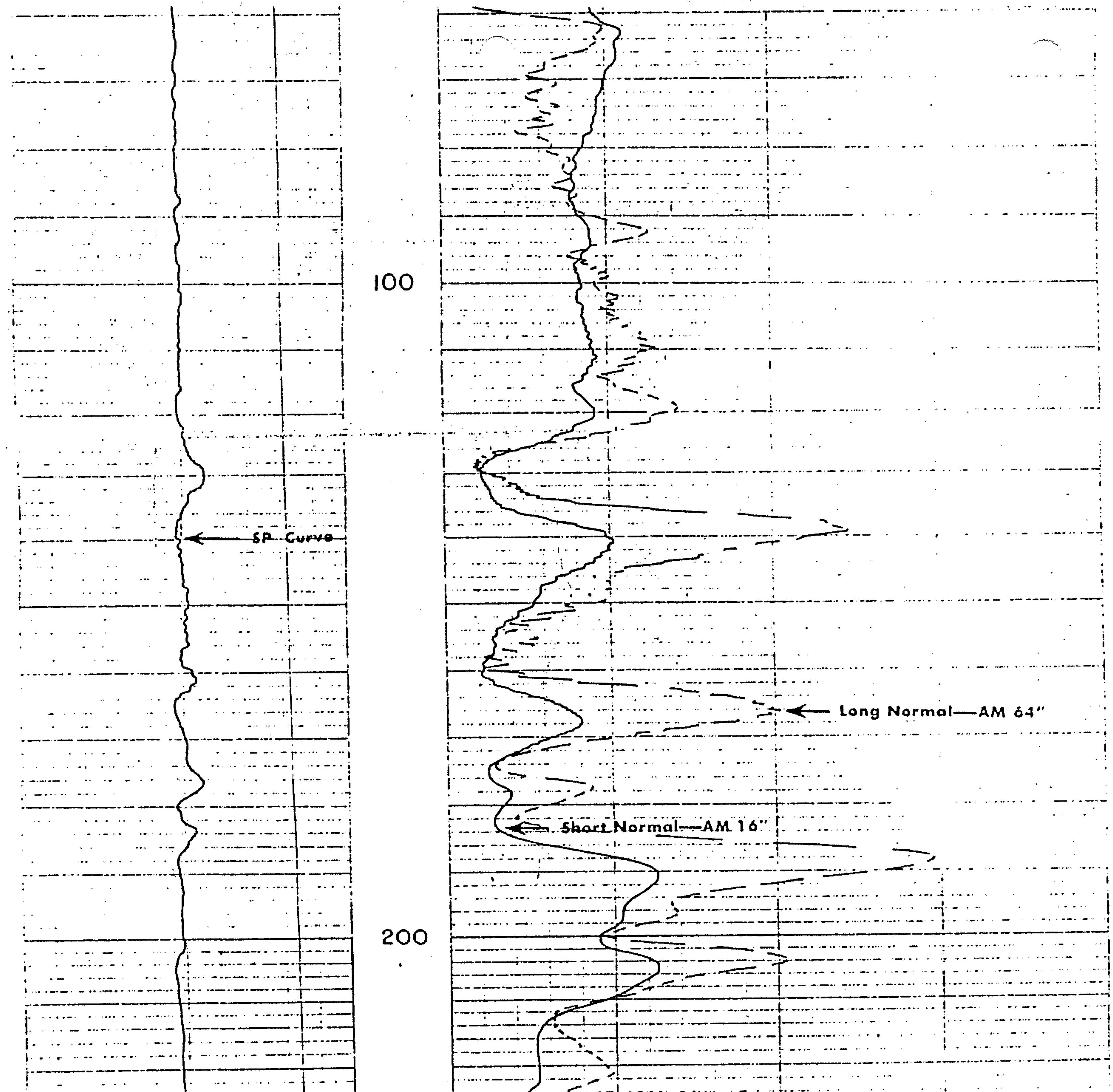
REMARKS

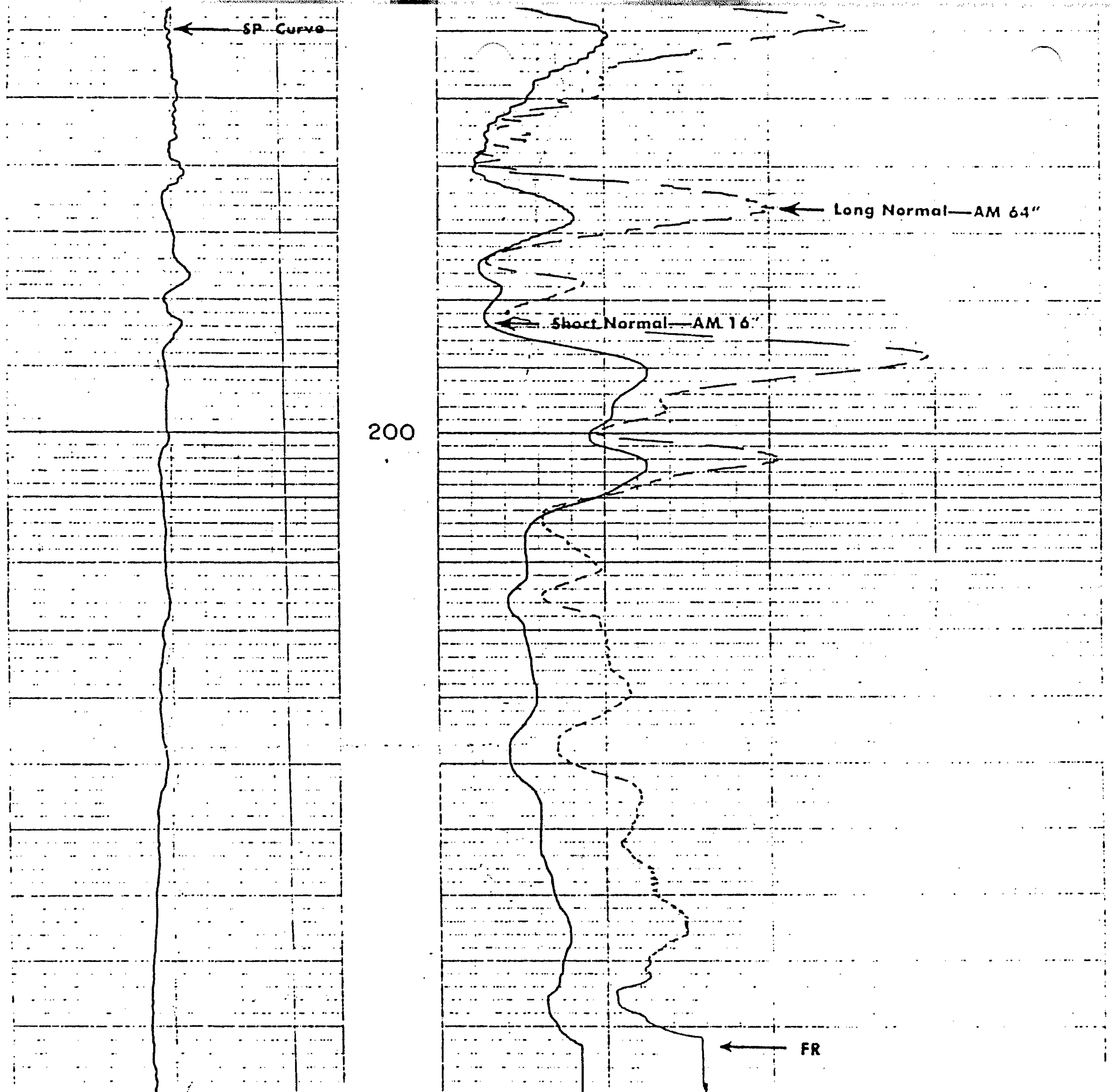
Changes in Mud Type or Additional Samples: Date | Sample No. | Depth—Driller | Type Fluid in Hole | Dens. | Visc. | pH | Fluid Loss ml | Source of Sample | R_m @ Meas. Temp. | R_{mf} @ Meas. Temp.

					Run No.	Tool Type	Pad Type	Tool Position	Other
@ Meas. Temp.	@	°F	@	°F					
R_m @ Meas. Temp.	@	°F	@	°F	ONE	ELECTRIC LOG		FREE	
R_{mc} @ Meas. Temp.	@	°F	@	°F					
Source: R_{mf} R_{mc}									
R_m @ BHT	@	°F	@	°F					
R_m @ BHT	@	°F	@	°F					
R_m @ BHT	@	°F	@	°F					

SPONTANEOUS POTENTIAL millivolts	Depths	RESISTIVITY ohms. m²/m	RESISTIVITY ohms. m²/m
5 − +		SHORT NORMAL 16 Inch 0 100	
		LONG NORMAL 64 Inch 0 100	RESISTANCE Detail Curve




SP Curve
100
200
Long Normal—AM 64"
Short Normal—AM 16"


SP Curve
200
Long Normal—AM 64"
Short Normal—AM 16"
FR

ORIGINAL
File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 241871

Intent No. Customer

[redacted]

CBI

HOWARD PUMP,
TEST PUMP DA.

NAME Valley Reclamation WELL DESIGNATION/LOCATION Hewitt Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS ______ TEST ______ SHEET ____ OF ____

DATE/ TIME 11-6-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
11:00		100		213		
11:05			2	215	Some	
12:25		100	2	215	Little	
1:28		100	2	215	None	
2:30		100	2	215	None	Pump running fine, 32 amps.
3:00		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	Shut down.
11-7-84						
6:00		100	2	215	None	Started pump, slightly cloudy discharge, cleared up quick
7:00		100	2	215	None	
9:00		100	2	215	None	
10:30		100	2	215	None	Poured cement around vault.
11:30		100	2	215	None	
12:30		100	2	215	None	
2:00		100	2	215	None	
3:30		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	
6:00		100	2	215	None	Shut Down.

HOWARD PUMP, INC.
TEST PUMP DATA

NAME Valley Reclamation WELL DESIGNATION/LOCATION ~~Hewitt~~ 515 Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS ______ TEST ______ SHEET ____ OF ____

DATE/ TIME 11-8-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
6:30		100	2	215	None	
7:30		100	2	215	None	
8:30		100	2	215	None	
9:30		100	2	215	None	
11:00		100	2	215	None	
12:00		100	2	215	None	End Test.

APPENDIX B

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

Corrected Report
12/17/84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Carbonate Alk (as CO_3), mg/L	0.0
Bicarbonate Alk (as HCO_3), mg/L	300
Hydroxide Alk (as $CaCO_3$), mg/L	0.0
Calcium (EDTA Titration), mg/L	11
Magnesium, mg/L	14
Chloride, mg/L	3.2
Copper, mg/L	<0.06
Surfactants, mg/L	<0.1
Iron, mg/L	<0.059
Manganese, mg/L	<0.032
pH, Units	7.8
Potassium, mg/L	3.5
Sodium, mg/L	34
Sulfate, mg/L	220
Specific Conductance, umhos/cm	830
Filterable Residue, mg/L	420
Zinc, mg/L	<0.013
Nitrate (as NO_3), mg/L	15

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Purgeable Priority Pollutants	
Extraction	11/19/84
:rolein, ug/L	<10
Acrylonitrile, ug/L	<10
Ethylbenzene, ug/L	3
Tetrachloroethylene, ug/L	3
Toluene, ug/L	8
Other Purgeable Priority Pollutants, ug/L	<1
Semi-Quantified Results **	
Xylene Isomers, ug/L	20

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard

Edward Wilson

Edward Wilson, Laboratory Director

HEWITT

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Field	Entry
Date Received	11-8-84
Lab. No. (Leave Blank)	13588
Purveyor and Address (include city and county)	VALLEY RECLAMATION-HEWITT PIT
System Number	
Serial Number	C 07970
Sampling Point	NEW WELL #1 - WEST
Collected by	Ramstedt
Date and Hour Collected	11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS: ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids (mg/l as Ca CO_3): ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):
VOA
see attached sheet

Date Reported	Analyst
11-9-84	P.H.

☐ Turb. TU ☐ Spec. Cond. µmhos/cm ☐ NH_3-N ☐ ORG-N ☐ BOD ☐ Grease ☐ Susp. Solids ☐ Set Solids ml/l/hour ☐ PO_4 ☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Field	Entry
Date Received	11-8-84
Lab. No. (Leave Blank)	13589
Purveyor and Address (include city and county)	VALLEY RECLAMATION-HEWITT PIT
System Number	
Serial Number	C 07974
Sampling Point	TRIP BLANK
Collected by	Lab - (ECR)
Date and Hour Collected	11-8-84 1130

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other TRIP BLANK

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS: ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids (mg/l as Ca CO_3): ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):
VOA
[illegible]
[illegible] = 0.25 ug/l

Date Reported	Analyst
11-9-84	P.H.

☐ Turb. TU ☐ Spec. Cond. µmhos/cm ☐ NH_3-N ☐ ORG-N ☐ BOD ☐ Grease ☐ Susp. Solids ☐ Set Solids ml/l/hour ☐ PO_4 ☐ MBAS

Form LAB-800 (2-80)

STATE OF CALIFORNIA - HEALTH AND WELFARE AGENCY
DEPARTMENT OF HEALTH SERVICES
PUBLIC AND ENVIRONMENTAL H[illegible]TH DIVISION (213) 620-3376
SOUTHERN CALIFORNIA LAB
1449 West Temple Street, Room 101
Los Angeles, California 90026

AN ATTACHMENT TO LAB-804

SAMPLES FOR CHEMICAL ANALYSIS

HEWITT PIT
NEW WELL #1

LAB NUMBER: 13588

SERIAL NUMBER: C 079 70

ANALYST: P.H

DATE REPORTED: 11-9-84

VOA

1. n-pentane
2. Petroleum distillate hydrocarbon C_6
3. Dipropyl ether
4. Benzene = 0.54 ug/L
5. Toluene = 7.2 ug/L
6. Perchloroethylene = 1.9 ug/L
7. Ethyl benzene = 2.3 ug/L
8. M, P-Xylenes = 9.8 ug/L
9. O-Xylene = 3.4 ug/L
10. n-propyl benzene = trace
11. Ethyl toluene isomers
12. Trimethyl benzene isomers
13. 3A,4,7,7A-tetrahydro-4,7-methanoindane
14. Indan

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received:
Lab. No. (Leave Blank): 13590
Purveyor and Address (include city and county): VALLEY RECLAMATION HEWITT PIT
System Number:
Serial Number: C 07971
Sampling Point: NEW WELL #1 - WEST
Collected by: RAMIREZ
Date and Hour Collected: 11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

			(mg/l as $CaCO_3$)	
☐ Ca			☐ Hardness	
☐ Mg			☐ HCO_3	
☐ Fe Total			☐ CO_3	
☐ Mn			☐ OH	
☐ Na			☐ Total Alk.	
☐ K			☐ Cl	
☐ pH			☐ SO_4	
			☐ F	
☐ Total Dissolved Solids			☐ NO_3	

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

BNA

Naphthalene = trace

Date Reported: 11-21-84
Analyst: PA

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84
Lab. No. (Leave Blank): 13587
Purveyor and Address (include city and county): VALLEY RECLAMATION HEWITT PIT
System Number:
Serial Number: C 07972
Sampling Point: New Well #1 - WEST
Collected by: RAMIREZ
Date and Hour Collected: 11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☑ GENERAL MINERAL ANALYSIS

		(mg/l as $CaCO_3$)	
☐ Ca	80.	☐ Hardness	205.
☐ Mg	1.2	☐ HCO_3	274.
☐ Fe Total	<0.1	☐ CO_3	0.
☐ Mn	<0.02	☐ OH	0.
☐ Na	58.	☐ Total Alk.	274.
☐ K	3.7	☐ Cl	25.
☐ pH	7.8	☐ SO_4	45.
		☐ F	0.2
☐ Total Dissolved Solids	455	☐ NO_3	14.

TRACE ELEMENTS

☐ Al	
☑ Ag	<0.001
☑ As	<0.01
☐ B	
☑ Cd	<0.001
☑ Cr	<0.01
☑ Cu	<0.01
☑ Hg	<0.001
☑ Pb	<0.01
☑ Ni	<0.05
☑ Se	<0.01
☑ Zn	<0.01
☑ Ba	0.143

☑ Other analyses desired (specify):

(HM)

Sb — < 0.02 mg/l

Be — < 0.01 mg/l

Tl — < 0.01 mg/l

Cr^{+6} — = <.001 mg/l

Date Reported: 11-21-84
Analyst: ST MI CL

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section

SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84	Lab. No. (Leave Blank) 13586
System Number:	Serial Number: C 07973
Purveyor and Address (include city and county): VALLEY RECLAMATION HEWITT PIT	
Collected by: RAMSTEDT	Date and Hour Collected: 11-8-84 1215
Sampling Point: NEW WELL #1 - WEST	

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS (mg/l as Ca CO_3)

☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS

☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

COD - 1 mg/L

CN⁻ - <0.001 mg/L

Phenol - 0.002 mg/L

Date Reported	Analyst
11-9-84	RS

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/1/hour	☐ MBAS

Form LAB-800 (2-80)

State of California · Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84	(Leave Blank)	Lab. No. 13586
Purveyor and Address (include city and county): VALLEY RECLAMATION HEWITT P.T	System Number:	Serial Number: C 07973
Sampling Point: NEW WELL #1 - WEST	Collected by: RAMSTEDT	Date and Hour Collected: 11-8-84 12:15

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

☐ Ca		☐ Hardness (mg/l as Ca CO_3)	
☐ Mg		☐ HCO_3	
☐ Fe Total		☐ CO_3	
☐ Mn		☐ OH	
☐ Na		☐ Total Alk.	
☐ K		☐ Cl	
☐ pH		☐ SO_4	
		☐ F	
☐ Total Dissolved Solids		☐ NO_3	

TRACE ELEMENTS

☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

COD - 1 mg/L

CN⁻ - <0.001 mg/L

Phenol - 0.002 mg/L

Date Reported: 11-9-84

Analyst: RS

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

APPENDIX D

LYSIMETER WELL LOGS AND

CONSTRUCTION DETAILS

LITHOLOGIC LOG

Owner:

Drilled by: Datum Exploration

Logged by: Vince Richards

Location: Calmat Storage Yard @ Laurel Canyon and Sherman Way

Project No.: 58-7057

Well No.: HLS-88-1 (Lysimeter)

Drilling Method: Hollow Stem Auger

Date Completed: 04-12-88

Borehole Depth: 52'

Borehole Diameter: 10"

Casing:

Perforations:

Static Water Level:

Drawdown:

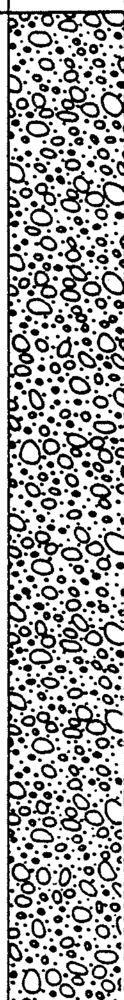
Yield:

Specific Capacity: ______ gpm/ft

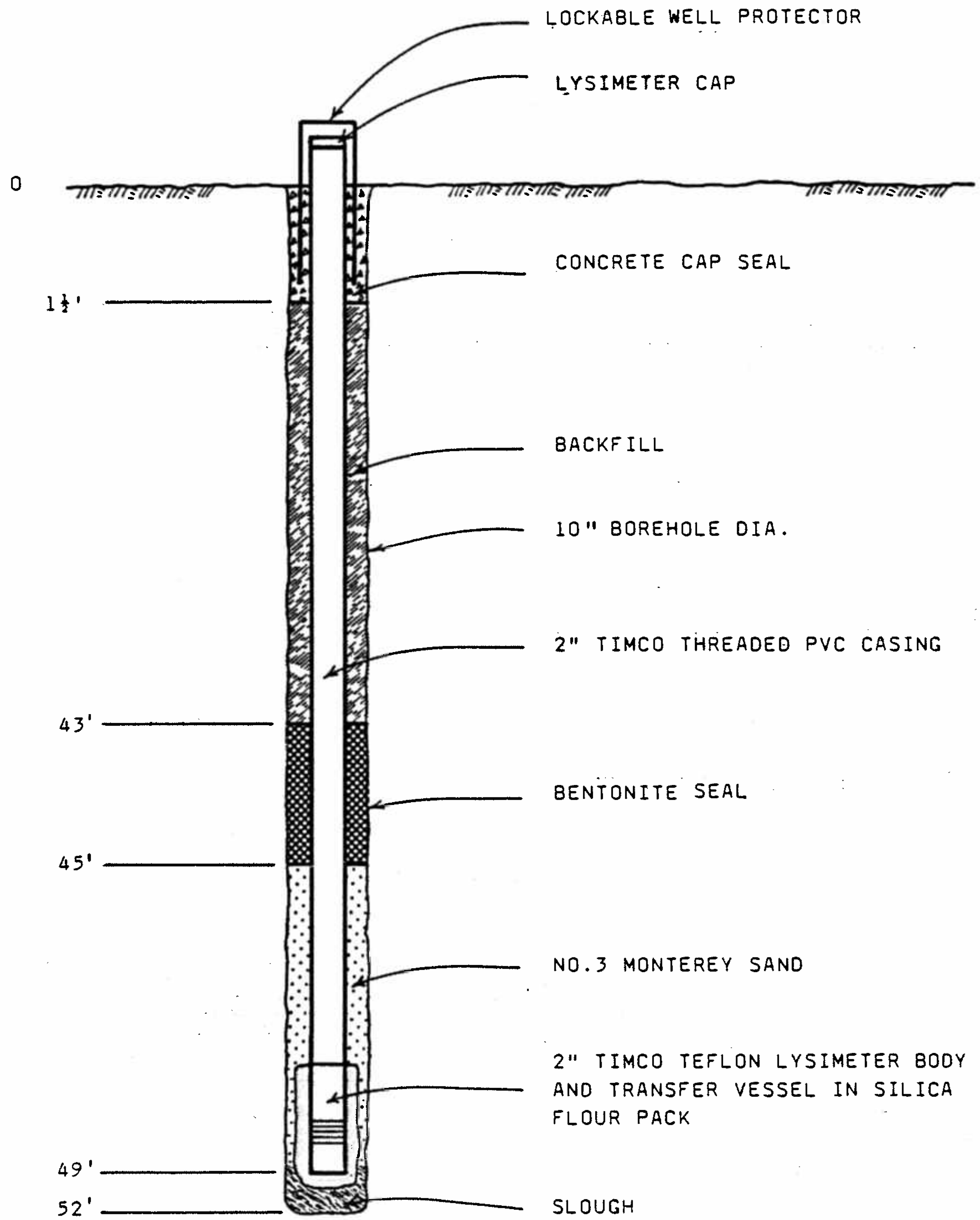
Electrical Conductance: ______ micromhos

Ground Elevation:

Top of Casing Elevation:

Depth (feet)	Sample Interval	Graphic Log	Description of Materials	
			SAND AND GRAVEL	Light grey fine to coarse sand and fine to coarse cobble gravel. Gravels are subangular to rounded and composed of metamorphic and igneous material. Alluvium slightly damp, well graded.
10				
20				
30				Gravel size decreasing, mostly fine to medium pebble gravel. Abundant sand.
40				
50				Gravel increasing in abundance. Total depth: 52'

Remarks:



LYSIMETER HLS 88-1 CONSTRUCTION DETAILS

HEWITT DOWNGRADIENT

NOT TO SCALE

LAW ENVIRONMENTAL, INC.

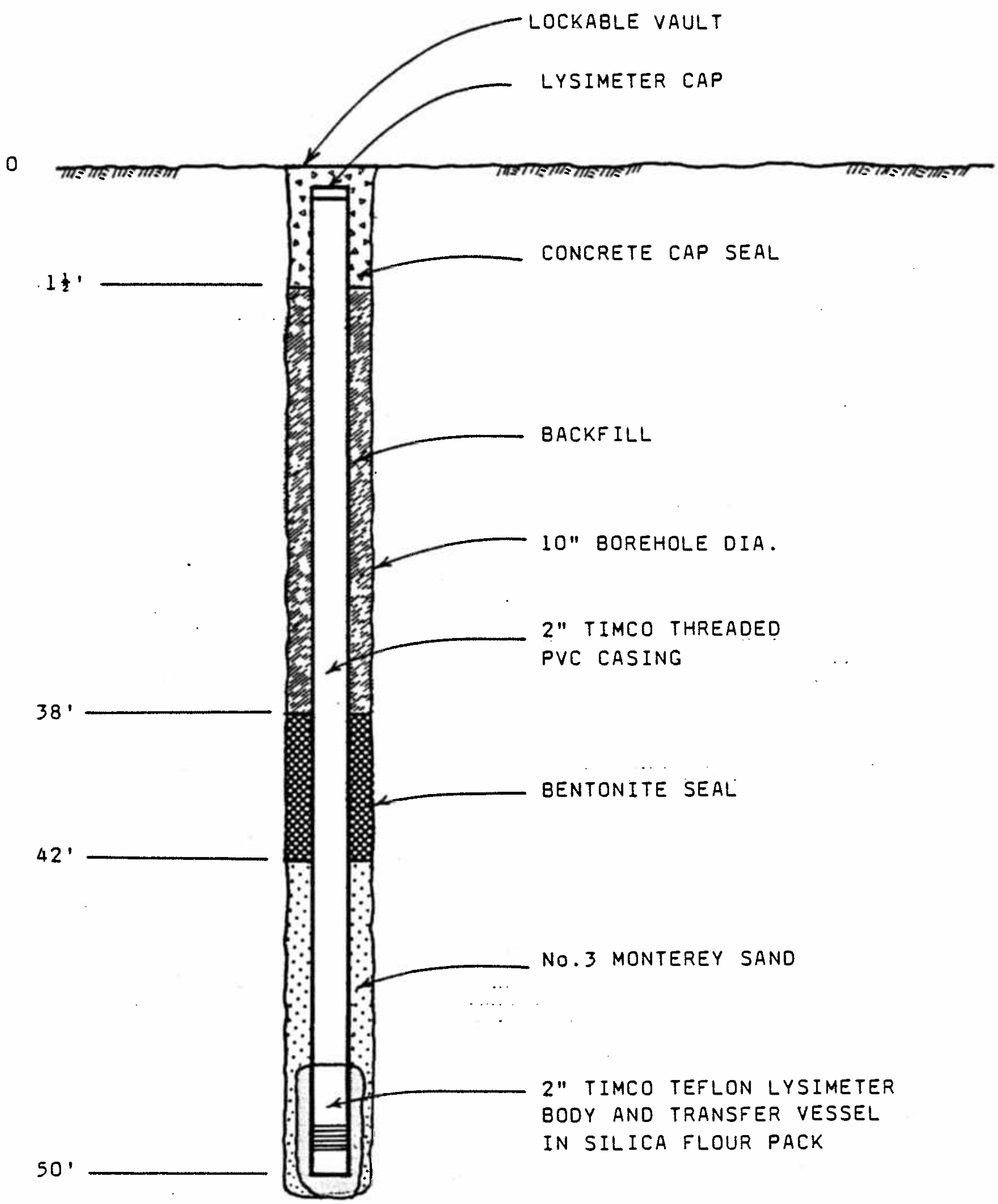
PROJECT No. 58-7057 DATE 6/2/88 PROJ. MGR. SHC CTR. M.G.

LITHOLOGIC LOG

Owner:	Cal Mat	Project No.:	58-7057
Drilled by:	Datum Exploration	Well No.:	HLS-88-2 (Lysimeter)
Logged by:	Vince Richards		
Location:	Saticoy St. (cul de sac) west of Hollywood Fwy.		
Drilling Method:	Hollow Stem Auger	Date Completed:	04-26-88
Borehole Depth:	50'	Borehole Diameter:	10"
Casing:			
Perforations:			
Static Water Level:		Drawdown: / Yield:	
Specific Capacity:	gpm/ft	Electrical Conductance:	micromhos
Ground Elevation:		Top of Casing Elevation:	

Depth (feet)	Sample Interval	Graphic Log	Description of Materials	
			SAND AND GRAVEL	Light grey fine to coarse sand and fine to coarse gravel. Gravels are subangular to rounded and composed of metamorphic and igneous materials. Alluvium slightly damp, well graded.
10				
20				
30				
40				
50				Total Depth: 50'

Remarks:



LYSIMETER HLS 88-2 CONSTRUCTION DETAILS

HEWITT UPGRADIENT

NOT TO SCALE

LAW ENVIRONMENTAL, INC.

PROJECT No. 58-7057 DATE 6/2/88 PROJ. MGR. SH TR. M.G.

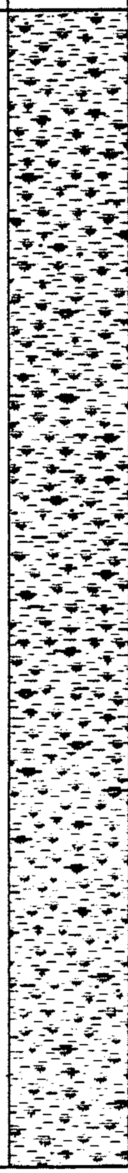
APPENDIX E

LEACHATE WELL LOGS

AND REFUSE MOISTURE CONTENT

LITHOLOGIC LOG

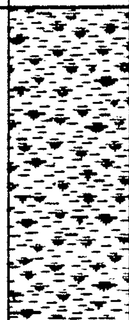
Owner:	CalMat	Project No.:	58-7057
Location:	Hewitt Landfill	Well No.:	Hewitt Leachate Well
Drilled by:	Datum Exploration	Page 1 of	2
Logged by:	Steve McArdle		
Drilling Method:	Air Rotary	Date Completed:	04-12-88
Borehole Depth:	76 feet	Static Water Level:	dry
Borehole Diameter:	6 inches		
Casing:	6" steel		
Perforations:	botton 40'	Drawdown:	Yield:
Ground Elevation:	feet/asl	Electrical Conductance:	micromhos
Top of Casing Elevation:		Specific Capacity:	gpm/ft

Depth (feet)	Sample Interval	Graphic Log	Description of Materials
			FILL Silt, sand, and gravel: no trash; tan to gray; slightly moist.
			Chips of wood common, paper and plastic not seen; material in a matrix of silty sand: black; small amounts of gravel; slightly to moderately moist. Little or no odor.
10			
			Increase in gravel amount; pieces of paper, plastic and metal noted.
20			
			At 25', paper (including carbon paper), plastic. Drill bit clogged up, as drilling slow and no material showing up in driller's box. Material that clogged up bit is pulverized wood/cardboard.
30			Sand and gravel: gravel amount 80% - demolition debris, no trash.
40			
50			Increase in sand amount - demolition debris, no trash.

Remarks:

LITHOLOGIC LOG

Project No.: 58-7057 Well No.: Hewitt Leachate Well Page 2

Depth (feet)	Sample Interval	Graphic Log	Description of Materials
			Sand: small amounts of gravel; buff to tan; slightly moist; some demolition debris. Minor amount of silt.
70			Micaceous; rock chips representative of rock in adjacent San Gabriel Mountains and what is expected of native material in area.
			Total depth: 76'
80			

Remarks:

Soil and Plant Laboratory, Inc.
Member of The California Association of Agricultural Laboratories
P.O. Box 11744, Santa Ana, California 92711-1744 (714) 558-8333 Telex Number IRIN 188747
P.O. Box 153, Santa Clara, California 95052-0153 (408) 727-0330
P.O. Box 1648, Bellevue, Washington 98009-1648 (206) 746-6665

SANTA CLARA OFFICE
April 25, 1988
Lab No. 11215

RECEIVED
LAW ENVIRONMENTAL, INC.
APR 27 1988
File.................................

LAW ENVIRONMENTAL, INC.
3420 N San Fernando Blvd Suite 200
Burbank, CA 91504

RE: SAMPLES REC'D: 4-15-88

Sample No.	Moisture Content %	Description
21	5.2	58-7056 GLW-88-1 10' Gregg Swat
22	40.4	58-7056 GLW-88-1 20' Gregg Swat
23	18.3	58-7056 GLW-88-1 30' Gregg Swat
24	23.4	58-7056 GLW-88-1 40' Gregg Swat
25	18.0	58-7056 GLW-88-1 50' Gregg Swat
26	17.9	58-7056 GLW-88-1 60' Gregg Swat
27	12.4	58-7056 GLW-88-1 68' Gregg Swat
28	11.4	58-7056 GLW-88-1 70' Gregg Swat
31	17.5	Hewitt HLW-88-1 58-7057 10'
32	15.0	Hewitt HLW-88-2 58-7057 20'
33	1.1	Hewitt HLW-88-3 58-7057 30'
34	0.5	Hewitt HLW-88-5 58-7057 Sample 5
35	1.1	Hewitt HLW-88-6 58-7057 Sample 6
36	2.1	Hewitt HLW-88-7 58-7057 Sample 7

Data are supplied without recommendation or comment.

LORI LITTLEFORD
Analytical Laboratory Director

LITHOLOGIC LOG

Owner:

Project No.: 58-7057

Drilled by: Datum Exploration

Well No.: HLS-88-1 (Lysimeter)

Logged by: Vince Richards

Location: Calmat Storage Yard @ Laurel Canyon and Sherman Way

Drilling Method: Hollow Stem Auger

Date Completed: 04-12-88

Borehole Depth: 52'

Borehole Diameter: 10"

Casing:

Perforations:

Static Water Level:

Drawdown:

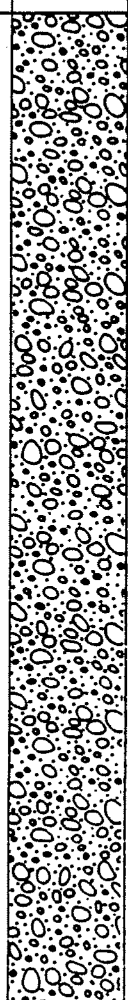
Yield:

Specific Capacity: gpm/ft

Electrical Conductance: micromhos

Ground Elevation:

Top of Casing Elevation:

Depth (feet)	Sample Interval	Graphic Log	Description of Materials	
			SAND AND GRAVEL	Light grey fine to coarse sand and fine to coarse cobble gravel. Gravels are subangular to rounded and composed of metamorphic and igneous material. Alluvium slightly damp, well graded.
10				
20				
30				Gravel size decreasing, mostly fine to medium pebble gravel. Abundant sand.
40				
50				Gravel increasing in abundance. Total depth: 52'

Remarks:

December , 1982

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby
General Manager

Gentlemen:

Background Hydrogeologic Data
Hewitt Landfill
North Hollywood, California

Pursuant to our telephone conversation of November 29, 1982, we are submitting this letter concerning nearby wells, water levels, and ground water quality in the vicinity of the Hewitt Landfill Site.

The Hewitt site is a closed landfill located in the central portion of the Tujunga Wash alluvial fan in the San Fernando Valley. Sand and gravel were mined at the site from 1930 to 1960, resulting in a pit some 145 feet deep. This pit was then filled with landfill refuse. The elevation of the site is about 750 feet above sea level and the base of the landfill refuse is at about 605 feet above sea level.

The locations of water wells in the vicinity of the site are shown on Plate 1, Well Location Map. There are other wells in the area, however, the wells shown on Plate 1 are those for which historic water level and water quality data are available.

Water level elevations for the years 1956 through 1979 at Well 1N/15W-1Q2 are shown on Plate 2, Hydrograph. Well 1N/15W-1Q2 is located about one-half mile south of the site. The water level elevation at this well was 521.8 feet above sea level in 1979, corresponding to a depth of about 228 feet below ground surface at the site and about 83 feet below the base of landfill refuse. The historic high water level at Well 1N/15W-1Q2 was 579.9 feet above sea level in 1956 or about 25 feet below the base of landfill refuse at the site. Due to continued pumping of ground water and basin management, it is unlikely that water levels will ever again reach the historic high level. The California Department of Water Resources (1979) conducted a theoretical model study on the potential for ground water storage in the San Fernando Basin. If the Basin is used to store State Water Project water in the future, the model study indicates that ground water levels would rise approximately 40 feet. Using the water level data for 1979, the water surface at the

DRAFT

site would be at about Elevation 562 feet. This level is about 43 feet below the base of the landfill and would not impact on landfill refuse at the site.

Chemical analyses of ground water from several nearby wells are given in Table 1, Ground Water Quality at Well Near Hewitt Landfill. These wells were selected because several analyses, taken over a period of time, were available for these wells.

If you have any questions regarding this letter or if we can be of further service, please contact us.

Yours very truly,

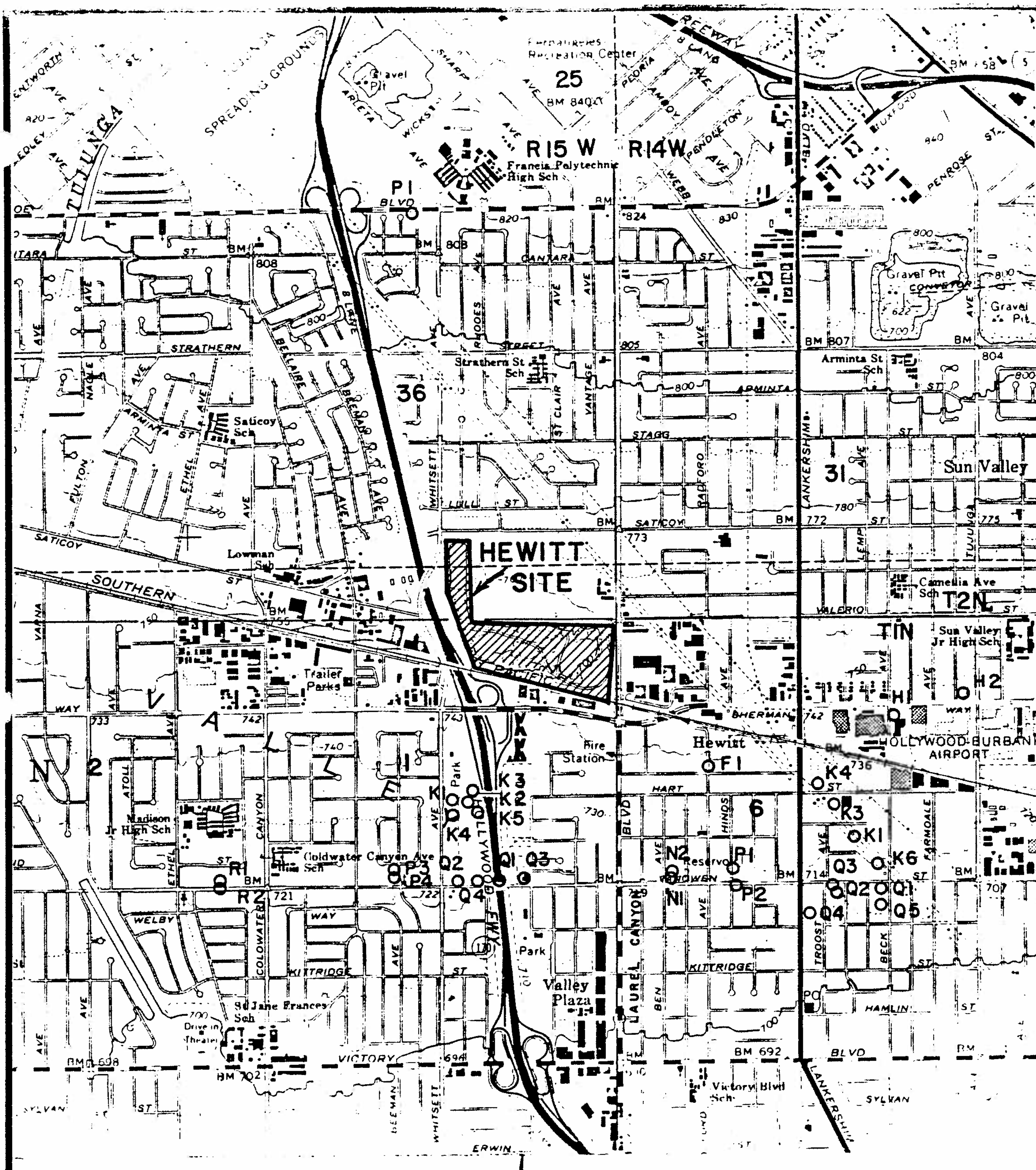
LeROY CRANDALL AND ASSOCIATES

by
Joan Oberholtzer
Staff Geologist

by
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB-JO/jj
Attachment
(copies submitted)

DRAFT



0 2000 4000

SCALE IN FEET

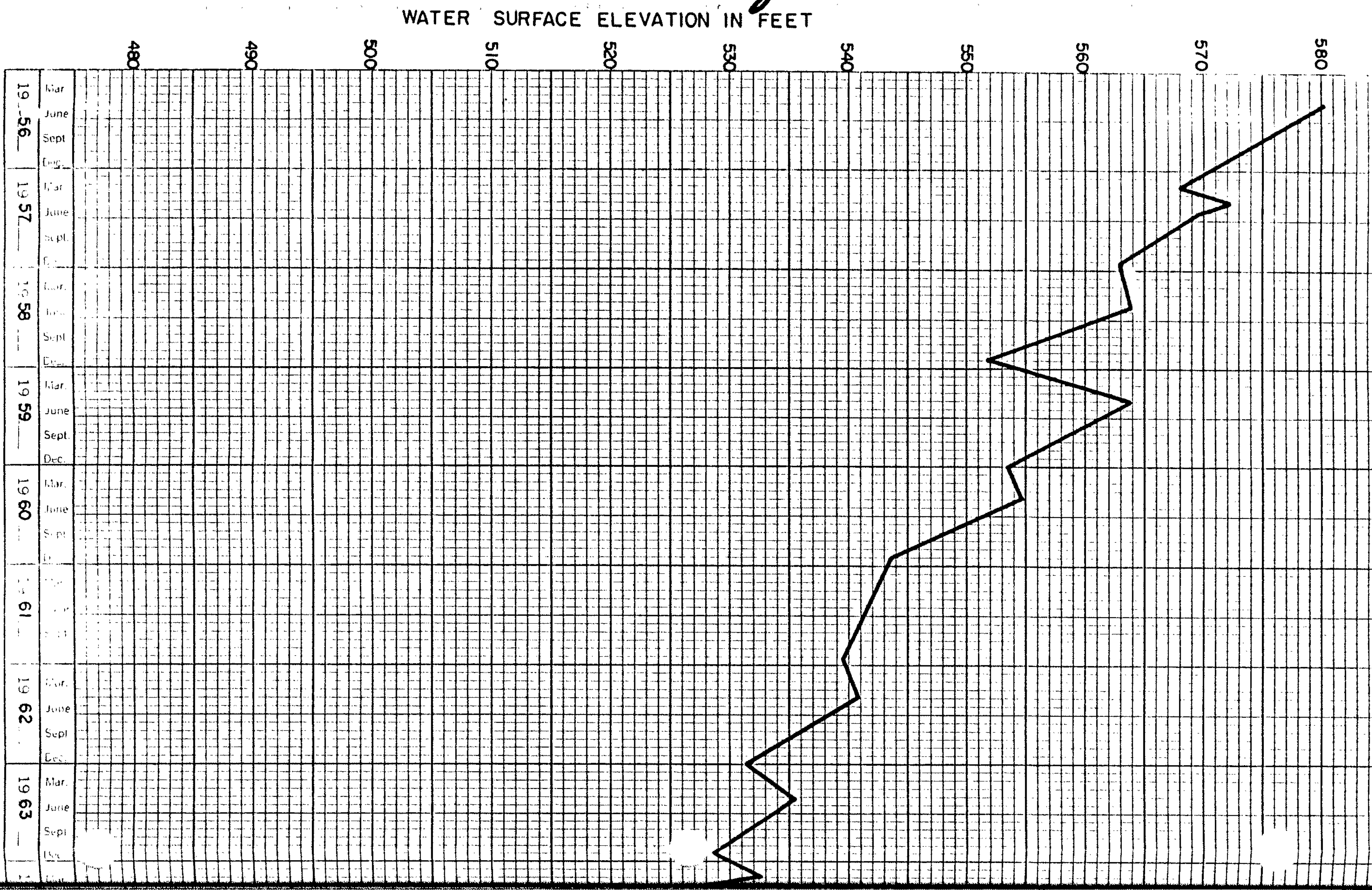
REFERENCE :
BASE MAP U.S.G.S. 7.5' QUADRANGLE
VAN NUYS 1966, PHOTOREVISED , 1972

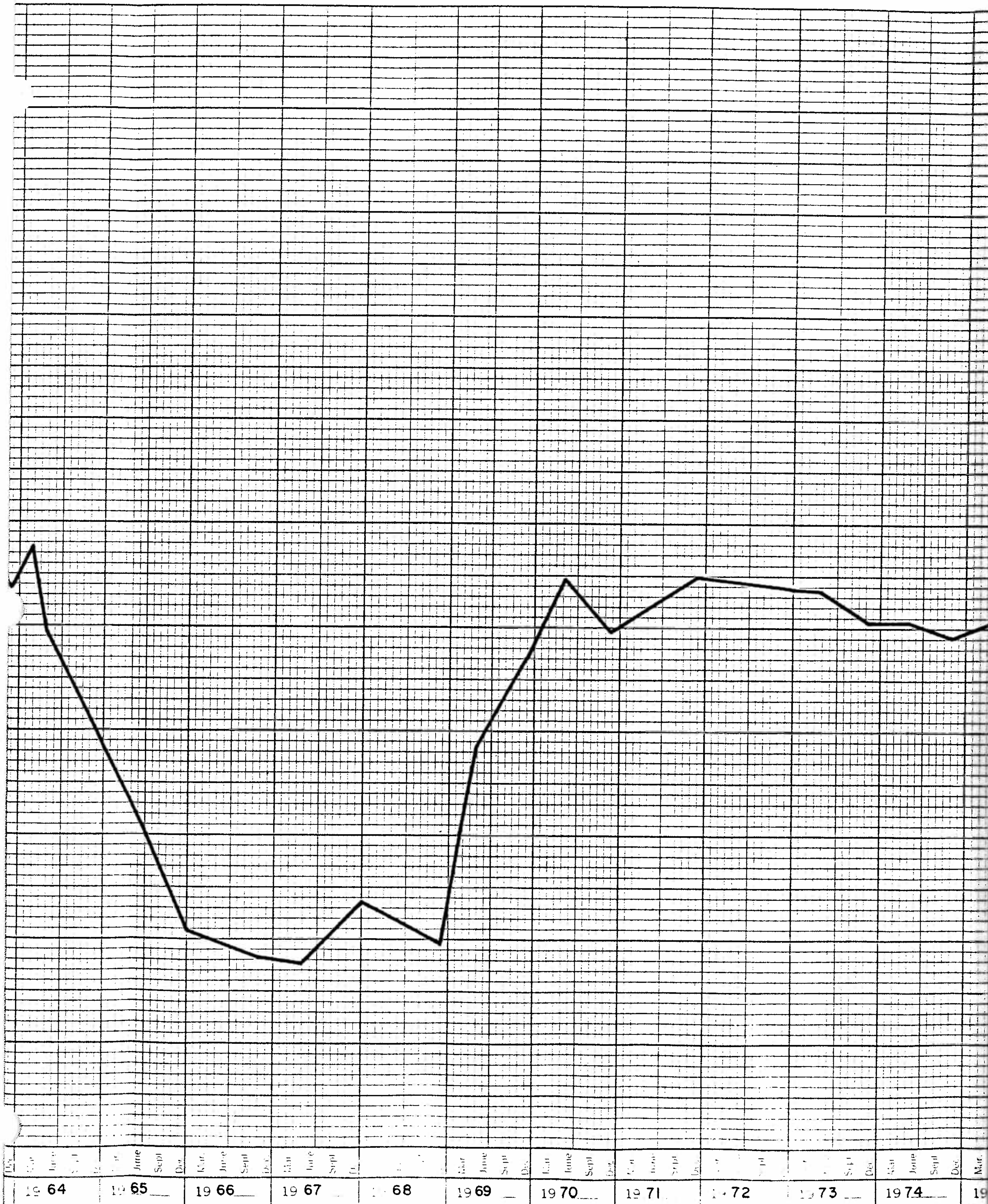
WELL LOCATION MAP

LeROY CRANDALL AND ASSOCIATES

PLATE I

JOB E-81001 DATE 12-7-82 DR._____ O.E._____ CHKD. JO





19 64
19 65
19 66
19 67
68
19 69
19 70
19 71
72
73
19 74
19

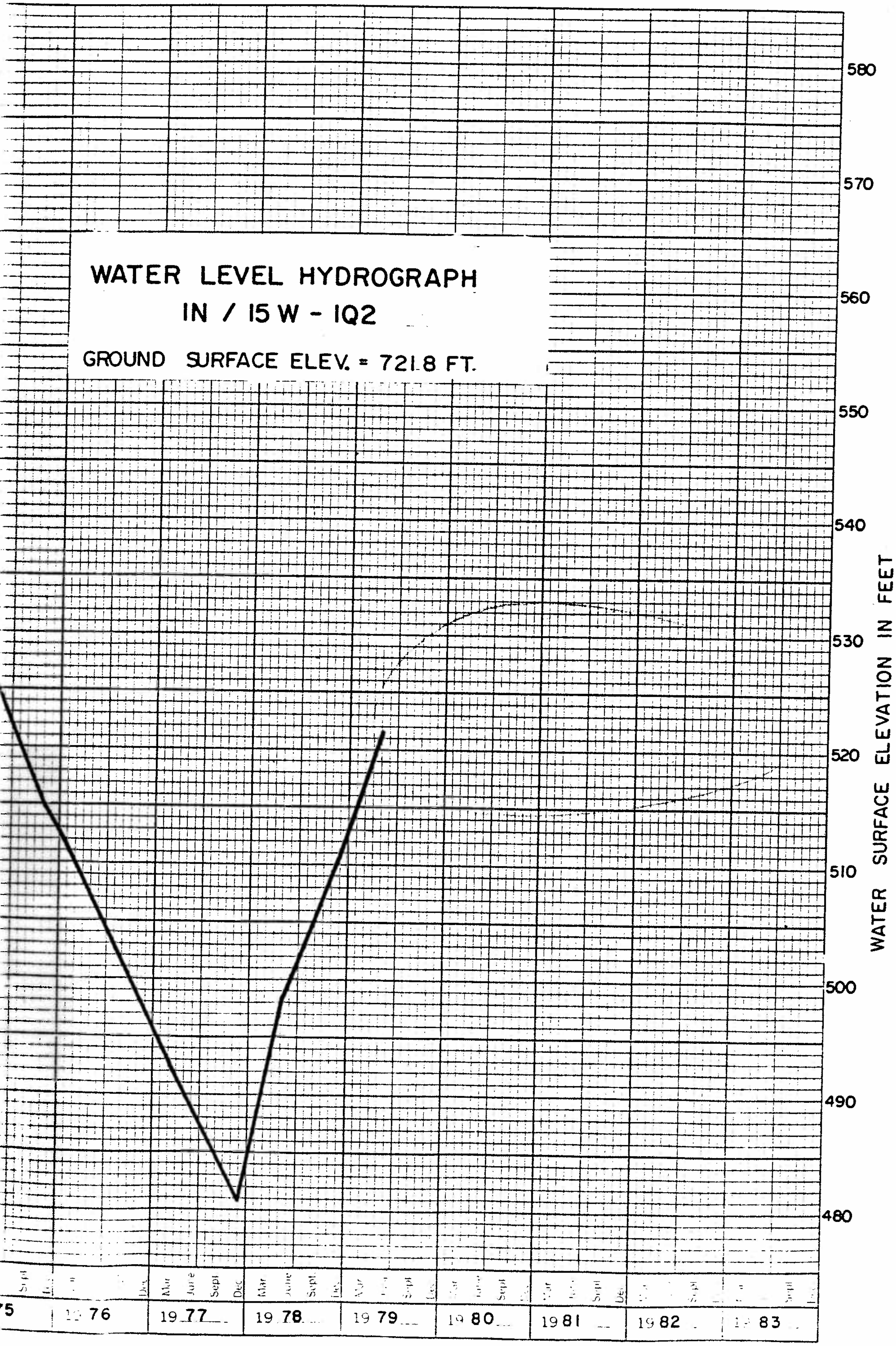

WATER LEVEL HYDROGRAPH
IN / 15 W - 1Q2
GROUND SURFACE ELEV. = 721.8 FT.
WATER SURFACE ELEVATION IN FEET
580
570
560
550
540
530
520
510
500
490
480
1976
1977
1978
1979
1980
1981
1982
1983

PLATE 2

TABLE 1

GROUND WATER QUALITY AT WELLS NEAR HEWITT LANDFILL

WELL NUMBER	DATE SAMPLED	EC x 10^6 AT 25°C	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION												TDS IN PPM
				Ca	Mg	Na	K	$CaCO_3$	HCO_3	SO_4	Cl	NO_3	F	B		
1N/14W-6N1	10-12-71	520	7.6	61	15	20	2.9	169		49	20	25	.3			312
1N/14W-6N1	10-04-73	503	7.7	62	12	21	3.0	165		45	17	20.0	.3			279
1N/15W-1K2	07-06-65	709	8.0	80	20	41	4.0	201		126	25	12.0	.4			449
1N/15W-1K2	06-20-72	761	7.8	89	25	45	3.9	204		171	27	9.0	.4			541
1N/15W-1Q2	07-16-70	950	8.1	101	31	59	2.8	218		239	24	20.0	.4			628
1N/15W-1Q2	10-11-73	955	7.7	101	31	63	3.0	212		263	23	22.0	.4			633
T2N/R15W-25P1	05-25-71	808	7.3	89	21	52	5.0	363		36	14	2.2	.3			463
T2N/R15W-25P1	10-19-73	670	7.6	80	15	47	4.0	312		35	11	6.7'	.4			386

SOLID WASTE ASSESSMENT TEST PROPOSAL

HEWITT LANDFILL

70-1032-01

A DIVISION OF KLEINFELDER

MANDEVILLE & ASSOCIATES

environmental engineering services

PROPRIETARY UNDERSTANDING

This document contains certain methodologies and procedures developed by Mandeville & Associates (M&A) for carrying out air monitoring work and engineering services required for compliance with California Health and Safety Code Section 41805.5 (Calderon), as specified in the Air Resources Board (ARB) implementing guidelines. M&A considers this material to be proprietary, and any disclosure or reproduction of methodologies and procedures described or other material contained herein is strictly prohibited without prior express written authorization from an authorized representative of Mandeville & Associates/Kleinfelder.

70-1032-01

SOLID WASTE ASSESSMENT TEST PROPOSAL
HEWITT LANDFILL

This monitoring proposal has been designed to satisfy the solid waste assessment test (SWAT) air quality requirements of California Health and Safety Code (HSC) Section 41805.5. It has been developed in accordance with the Testing Guidelines for Active Solid Waste Disposal Sites prepared by the State of California Air Resources Board (ARB). It is proposed that the testing be implemented on a phased basis, using the first phase as a screening procedure to determine the need for further testing, including ambient air monitoring. This proposal addresses the initial Phase I requirements identified for this site through discussions with the South Coast Air Quality Management District (SCAQMD).

Section 1 describes the proposed plan for gas stream characterization, using the existing interior collection system. The gas migration testing plan in Section 2 proposes to use existing perimeter probe monitoring data to satisfy the preliminary testing requirements. A quality assurance plan for landfill gas testing is included in Section 3. As requested by the District, results of previous probe monitoring are provided in Appendix A. A site map showing proposed sampling and monitoring locations is contained in Appendix B. Appendix C includes the sampling and analytical methods published by the ARB for air and gas testing. The SCAQMD-approved alternative analytical methods employed by ERT Air Toxics Laboratory are summarized in Appendix D. ERT's quality assurance/quality control procedures are included in Appendix E.

SOLID WASTE ASSESSMENT TEST PROPOSAL

HEWITT LANDFILL

CONTENTS

CONTENTS (Continued)

TABLES

EXHIBITS

APPENDICES

SECTION 1

GAS STREAM CHARACTERIZATION PLAN
HEWITT LANDFILL

The Hewitt Landfill is located at 7245 Laurel Canyon Boulevard in the North Hollywood area of Los Angeles. The property comprises a total of 63 acres, with the landfill occupying most of that area. Before landfilling operations began in the early 1960s, the site was used for mining sand and gravel. Once the permitted quantity of material had been excavated, the resulting pit was filled with municipal and commercial waste and inert construction debris. The dates of landfill operation were from approximately 1963 through 1975. In 1977, a gas collection system and flare station were installed. Over the succeeding years, this initial system has been modified, expanded, and relocated in order to control gas migration. The current system includes approximately 60 wells installed to depths ranging from 35 feet to 90 feet.

The internal landfill gas sampling method will be employed to characterize the gas within this site, using the existing gas recovery system to collect a composite sample. The site map in Appendix B illustrates the layout of the existing system and the proposed sampling location.

LANDFILL GAS SAMPLING

Collection System Sampling Procedure

One composite gas sample will be collected in a 10-liter Tedlar bag at the blower/flare station using a portable battery-operated sampling pump. The gas sample will be collected using the direct pump sampling procedure described in Section 7.1.2 of EPA Method 18. Any required measures will be implemented during sampling to mitigate potential emissions and odor. The sampling date, time, and sample location will be recorded on a field sampling log and sample tag. The bag sample will be kept in a light-sealed container at all times.

Gas Sample Analysis

The gas sample will be submitted to ERT Air Toxics Laboratory for analysis to determine the concentrations of methane, oxygen, carbon dioxide, nitrogen, and the air contaminants listed in Attachment 1 of the ARB guidelines, using the "disposal site" detection limits. The sample will be submitted expediently to ensure it is analyzed within 72 hours after collection.

REPORTING RESULTS

The following data will be submitted to the SCAQMD in the SWAT report:

A. Volume concentration of methane, oxygen, carbon dioxide, and nitrogen

B. Volume concentration of Attachment 1 compounds

C. Analytical methods

D. Quality control records

E. Chain-of-custody records

F. Landfill topographic map, drawn to scale, with the sampling location clearly marked and identified.

SECTION 2

GAS MIGRATION MONITORING PLAN
HEWITT LANDFILL

The Hewitt Landfill is bounded by Saticoy Street on the north, Laurel Canyon Boulevard on the east, the Southern Pacific Railroad Company right of way on the south, and Whitsett Avenue and the Hollywood Freeway on the west. Residential subdivisions are adjacent to the disposal site on the north and east.

To detect the existence of off-site gas migration, a monitoring system consisting of 47 single and multiple-depth probes has been installed at the perimeter of the landfill. Probes are monitored on a weekly basis. As specified by the SCAQMD, available test data for the perimeter probes during the preceding year are provided in Appendix A. The locations of the probes are shown on the SWAT site monitoring plan in Appendix B. Probe depths are delineated in Table 2-1.

In recent years, portions of the landfill surface have been used for commercial storage purposes. Along the eastern side of the landfill are shipping containers which have been specially modified for public storage use. Other sections of the site are used for storage of vehicles, discarded motor homes, and automobile salvage. On numerous occasions, methane gas monitoring has been performed below the storage containers and in all other areas where combustible gas could accumulate. No methane has ever been detected using a lower explosive limit (LEL) gas meter. Additionally, barhole probes driven into the landfill surface in these areas have shown no measurable methane concentrations in the LEL range.

Presently it is estimated that at least eight to 25 feet of soil cover exists over all portions of the refuse. The extensive cover and the gas collection system currently appear to be providing effective control of migration, emissions, and odor.

TABLE 2-1 PERIMETER MONITORING PROBE DEPTHS
HEWITT LANDFILL

Probe	Casing Depth (ft)				
	0	A	B	C	D
P1	5	20	-	-	-
P2	5	20	-	-	-
P3	-	-	30	-	-
P4	5	20	-	-	-
P5	5	20	-	-	-
P6	-	-	30	60	90
P7	5	20	-	-	-
P8	-	20	-	-	-
P9	5	-	-	-	-
P10	5	20	-	-	-
P11	-	-	30	-	-
P12	-	-	30	-	-
P13	-	20	30	-	-
P13X[a]					
P14	-	-	30	60	-
P15	-	20	-	-	-
P16	-	20	30	-	-
P16X[a]					
P17	-	20	-	-	-
P18	-	-	30	-	-
P19	5	-	-	-	-
P20	5	20	-	-	-
P22	5	20	-	-	-
P23	5	-	-	-	-
P24	5	20	-	-	-
P25	5	20	-	-	-
P26	5	20	-	-	-

(Continued)

[a] Depth information unavailable at time of publication.

TABLE 2-1 PERIMETER MONITORING PROBE DEPTHS (Continued)
HEWITT LANDFILL

Probe	Casing Depth (ft)				
	0	A	B	C	D
P27	5	20	-	-	-
P28	5	-	-	-	-
P29	-	-	30	60	-
P30	-	20	-	-	-
P31	5	20	-	-	-
P32	5	20	-	-	-
P33	5	-	-	-	-
P34	5	-	-	-	-
P35	5	-	-	-	-
P36	-	-	30	-	-
P37	5	-	-	-	-
P38	5	-	30	-	-
P39	5	-	-	-	-
P40	5	-	-	-	-
P41	5	-	-	-	-
P42	5	-	-	-	-
P43	5	-	-	-	-
P44	-	20	-	-	-
P45	5	-	-	-	-
P46	5	-	-	-	-

SECTION 3

QUALITY ASSURANCE PLAN FOR LANDFILL GAS TESTING
HEWITT LANDFILL

QUALITY ASSURANCE OBJECTIVES

These quality assurance procedures for landfill gas testing are designed to establish the necessary quality control activities relating to sample collection, sample analysis, data validation, and assessment of data quality in terms of accuracy and completeness.

SAMPLING METHODS

The specific sampling methods described here for landfill gas testing include sampling procedures and sample handling/quality control activities and documentation. All sampling equipment is designed, constructed, and maintained to meet or exceed standards established by the ARB testing guidelines. Mandeville & Associates' proprietary air and gas sampling procedure manuals have been reviewed by the SCAQMD. The manuals contain equipment specifications; monitoring and sampling procedures; training program outlines; condensed operating instructions; acceptance and performance testing procedures; equipment maintenance and calibration methods and schedules; and original equipment manufacturers' literature; in addition to procedures for sample handling/transportation, field quality assurance/quality control (QA/QC), chain-of-custody transfer, and related forms and records. Also included are personnel written and performance qualification tests.

Sampling Procedures

Procedures for sampling with Tedlar bags, including testing, leak checking, and reuse, have been derived from the ARB guidance documents "Procedure for Atmospheric Tedlar Bag Sampling" (ARB Method 201) and "Procedure for the Fabrication and Testing of Sample Bags" (ARB Method 202). Purging/inspection logs are maintained for all Tedlar bags.

Tedlar bags will be triple-flushed and evacuated prior to any use. Each bag is assigned a permanent and unique identification number, and a history of use is maintained from the first time the bag is used until it is ultimately removed from service. Landfill gas samples are collected in Tedlar bags which have been prepared by flushing followed by thermal desorption.

Sample Handling/Quality Control Activities and Documentation Procedures

M&A strictly adheres to all field and sample handling QA/QC procedures specified in ARB Methods 101, 102, and 103. These generic methods are contained in Appendix C.

All recommended quality control and chain-of-custody procedures will be implemented preceding, during, and after sampling operations. Quality control data sheets will be used to record sampling date and location; initials of individuals conducting the sampling, analysis and data reduction; sample number; initial and final time and flow; malfunctions; leak checks; and weather conditions which could influence sample results.

Data for each sample collected will be entered on a chain-of-custody record as shown in Exhibit 3-1. The custody sheet will always accompany the bag samples. Each time a bag changes hands, the individual receiving the sample will sign the custody sheet and record the time of custody transfer. Laboratory personnel will record the condition of the sample (full, one-half full, one-fourth full, or empty).

Prior to use, the Tedlar bags will be evacuated and flushed with ultra-pure nitrogen three times. Before the bags are sent into the field, they will be checked to ensure the vacuum has been maintained. The bags will be removed from service if leakage has occurred. All bag samples will be kept in light-sealed containers to avoid photochemical reactions. Each bag has a unique identification number. The sampling history of the bag will be maintained on a tag attached to the box containing the sample and on a historical log sheet (see Exhibit 3-2).

EXHIBIT 3-1

CHAIN-OF-CUSTODY RECORD

MANDEVILLE & ASSOCIATES
environmental engineering services

CHAIN-OF-CUSTODY RECORD

PROJECT NUMBER	PROJECT NAME

SAMPLE CONTAINER PREPARATION

SAMPLE CONTAINER	PREPARED BY	DATE	TIME	ISSUED TO

FIELD SAMPLING RECORD

SAMPLER CONTAINER	SAMPLER NO.	DATE	TIME	CONDITION IN LAB*	FIELD TESTING			SAMPLER LOCATION

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	LABORATORY NAME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	
SAMPLE DISPOSAL METHOD: (SIGNATURE)	DATE	TIME	DISPOSED OF BY: (SIGNATURE)	COMMENTS:
RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	REMARKS	

* NOTE: EMPTY = E EMPTY-1/4 = 1 1/4-1/2 = 2 1/2-3/4 = 3 3/4-FULL = 4 OVER FULL = 0

REVIEWED BY:_____ DATE:_____

FORM7A

EXHIBIT 3-2

TEDLAR BAG HISTORICAL LOG

MANDEVILLE & ASSOCIATES
environmental engineering services

TEDLAR BAG HISTORICAL LOG

BAG NUMBER: ____________

BAG PREPARATION					FIELD RECORD				LABORATORY	
PREPARED BY	DATE	TIME	ISSUED TO	PURGING/INSPECTION CHECKLIST COMPLETED	SAMPLER NUMBER	PUMP NUMBER	PROJECT NUMBER	DATE OF USE	DATE SUBMITTED TO LAB	DATE RETURNED FROM LAB

FORM17 3/17/87

Equipment will be inspected to ensure there is no leak in the system. Faulty equipment will be repaired prior to use. An operations log and equipment maintenance log will be maintained for each piece of equipment. Other proprietary quality control documentation developed by Mandeville & Associates, including equipment inspection logs, operation checklists, and calibration/maintenance records, have been reviewed by the SCAQMD.

The following quality control procedures will be implemented for sampling the collection system:

A. Record the identification number of the sampling bag.
B. Document the date and time the sample is collected.
C. Clearly mark the sampling location on a landfill site map drawn to scale.

Instantaneous monitoring data for the sample will be entered on a field sampling log as shown in Exhibit 3-3. A calibration log will be maintained for the monitoring instrument (see Exhibit 3-4).

ANALYSIS METHODS

Methods for sample preparation and analysis have been derived from ARB-approved methods, such as those included in Appendix C. The alternative methods developed by ERT for sample analysis have been approved by the SCAQMD. These methods are described in Appendix D. If modifications are necessary, the changes will be fully documented, and validation testing will be conducted to provide an assessment of accuracy, precision, interferences, applicable concentration ranges, recoveries, and limits of detection of the alternative method. A summary of the QA/QC program developed by ERT is provided in Appendix E.

EXHIBIT 3-3

FIELD SAMPLING LOG

MANDEVILLE & ASSOCIATES
environmental engineering services

FIELD SAMPLING LOG

DATE: ____________ M & A PROJECT NO. ____________
LOCATION: ____________
TECHNICIAN: ____________
WEATHER CONDITION: ____________
BAROMETRIC PRESSURE START: ____________
BAROMETRIC PRESSURE FINISH: ____________
WEAHER STATION: ____________
INSTRUMENTS USED & SERIAL #'S ____________

LOCATION NO.	CH_4 PPM	% LEL	CH_4 % VOLUME	% O_2	EVACUATION TIME		BAG I.D. NO.	TESTING TIME

REVIEWED BY: DATE:

FORM 18

EXHIBIT 3-4

MONITORING INSTRUMENT CALIBRATION LOG

OVA CALIBRATION LOG

M&A # ____________

SERIAL # ____________

MODEL # ____________

OPERATOR	DATE	BATTERY CHECK	FLOW METER READING	PRESSURE AT SUCTION "V.C."	ZERO READING 10 PPM	100 PPM	1000 PPM	CH4 CALIBRATION GAS UNCORRECTED READINGS LOW PPM	ACT.	MED. PPM	ACT.	HIGH PPM	ACT.	CH4 CALIBRATION GAS CORRECTED READINGS LOW PPM	CAL.	MED. PPM	CAL.	HIGH PPM	CAL.	3 PT. CALIBRATION [illegible] ___ PPM	___ PPM	___ PPM	[illegible]	COMMENTS PROBLEMS [illegible]

Chemical characterization of the specified gas sample will be performed for the Attachment 1 compounds listed in Table 3-1. Analyses will be performed to the detection limits in the "disposal site" column.

TABLE 3-1 SPECIFIED AIR CONTAMINANTS
ATTACHMENT 1 COMPOUNDS

	Minimum Detection Limit (ppb)	
Constituent	Air	Disposal Site
Chloroethene (vinyl chloride)	2	500
Benzene	2	500
1,2-Dibromoethane (ethylene dibromide)	0.5	1
1,2-Dichloroethane (ethylene dichloride)	0.2	20
Dichloromethane (methylene chloride)	1	60
Tetrachloroethene (perchloroethylene)	0.2	10
Tetrachloromethane (carbon tetrachloride)	0.2	5
1,1,1-Trichloroethane (methyl chloroform)	0.5	10
Trichloroethylene	0.6	10
Trichloromethane (chloroform)	0.8	2

The analytical methods employed by ERT for the specified air contaminants are summarized here. Detailed method descriptions are provided in Appendix D.

Method for Vinyl Chloride

Samples will be analyzed using gas chromatography with photoionization detection (PID). Concentration peaks will be identified by retention times and quantified by reference to calibration standards.

Method for Carbon Tetrachloride, Chloroform, Ethylene Dibromide, Ethylene Dichloride, Methyl Chloroform, Methylene Chloride, Perchloroethylene, and Trichloroethylene

Samples will be analyzed using gas chromatography with electron capture detection (ECD). Concentration peaks will be identified by retention times and quantified by reference to calibration standards.

Method for Benzene

Samples will be analyzed by gas chromatography using photoionization detection (PID). Concentration peaks will be identified by retention times and quantified by reference to calibration standards.

Method for Methane, Carbon Dioxide, Nitrogen, and Oxygen

Samples will be analyzed by gas chromatography using thermal conductivity detection (TCD). Concentration peaks will be identified by retention times and quantified by reference to certified calibration standards.

Laboratory Calibration

Specific calibration procedures will be submitted upon request by the laboratory performing the analyses, including intervals for recalibration, calibration standards, environmental conditions for calibrations, and a calibration recordkeeping system. When possible, National Bureau of Standards (NBS) traceable gas standards will be used for calibration of the analytical instruments in accordance with standard analytical procedures which include multiple calibration points that bracket the expected concentrations.

PREVENTIVE MAINTENANCE

To prevent loss of data, spare pumps and sampling materials will be kept available in the field by the operator. A schedule will be used for checking sampling pumps, extension cords, crimps in sampling tubing, and leaks.

DATA VALIDATION PROCEDURES

Accuracy

To ensure the accuracy of reported results the laboratory employs secondary verification, control blanks, recovery samples, and replicate analyses. Methods used to verify identification of a specific chromatographic peak include dual gas chromatographic (GC) column analysis, the standard addition technique, the use of labelled compounds as surrogates in GC/mass spectral analysis, and the use of two different detectors where appropriate. The laboratory also assesses recoveries for every sample set received by analyzing quality control samples which contain most or all of the parameters of interest. These QC samples are standards obtained from the U.S. EPA. As an additional check, the laboratory may also employ its own QC-spiked recovery samples. Replicate analyses are performed for client samples as well as quality assurance samples to validate the accuracy of measurements. Reagent blanks are also carried through the entire procedure as an additional check on the integrity of the results and on glassware interference and experimental contamination. Average accuracy and standard deviation are calculated for entire data sets.

Completeness

Data completeness is calculated as a percentage of valid data compared to the total possible amount of data if no invalidations had occurred. Data will be invalidated if equipment power has been interrupted and the length of the sample cannot be verified or if the sampling medium breaks during sampling or shipment.

Performance Audits

Analytical audits will be conducted if required by the SCAQMD by having another laboratory analyze split samples for comparison of results.

Comparability

The results of all organic species will be reported in parts per billion by volume. The minimum detection limit for each component will be the limit specified in the testing guidelines (see Table 3-1).

QUALITY ASSURANCE REPORTS

Quality assurance activities and data will be summarized by the staff conducting the sampling and included in the final SWAT Report.

APPENDIX A

PREVIOUS PROBE MONITORING RESULTS
HEWITT LANDFILL

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE 28-APR-88
WEEKLY MONITORING PERIOD.............................. 4-APR TO 26-APR-88

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED.. 93
NO. OF PROBES MONITORED.. 76

NO. OF PROBES WITH NO METHANE...................................... 76
NO. OF PROBES WITH TRACE TO 4.9% METHANE......................... 0
NO. OF PROBES WITH 5 TO 15% METHANE............................... 0
NO. OF PROBES WITH >15% METHANE..................................... 0

NO. OF PROBES REQUIRING MAINTENANCE..............................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

NONE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES, INC.

GROVESPRING ASSOCIATES. INC.
(213) 377-8753

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	3-29	4-5	4-12	4-21	4-26
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0	0	0	0	0
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-29	4-5	4-12	4-21	4-26
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-29	4-5	4-12	4-21	4-26
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

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EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE 29-MAR-88
WEEKLY MONITORING PERIOD............................... 3-MAR TO 29-MAR-88

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED... 93
NO. OF PROBES MONITORED... 76

NO. OF PROBES WITH NO METHANE................................... 76
NO. OF PROBES WITH TRACE TO 4.9% METHANE......................... 0
NO. OF PROBES WITH 5 TO 15% METHANE.............................. 0
NO. OF PROBES WITH >15% METHANE.................................. 0

NO. OF PROBES REQUIRING MAINTENANCE.............................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

NONE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

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GROVESPRING ASSOCIATES, INC.

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	3-3	3-8	3-16	3-22	3-29
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0.2	0.2	0	0.2	0
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-3	3-8	3-16	3-22	3-29
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-3	3-8	3-16	3-22	3-29
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE 29-FEB-88
WEEKLY MONITORING PERIOD.............................. 4-FEB TO 23-FEB-88

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED.. 93
NO. OF PROBES MONITORED.. 76

NO. OF PROBES WITH NO METHANE.................................. 75
NO. OF PROBES WITH TRACE TO 4.9% METHANE....................... 1
NO. OF PROBES WITH 5 TO 15% METHANE............................ 0
NO. OF PROBES WITH >15% METHANE................................ 0

NO. OF PROBES REQUIRING MAINTENANCE............................ 0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

6C TRACE TO 4.9% METHANE.

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES, INC.

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EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	1-26	2-4	2-9	2-16	2-23
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0.2	0	0	0	0.2
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	1-26	2-4	2-9	2-16	2-23
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	1.25	0	2.25	24	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	1-26	2-4	2-9	2-16	2-23
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

RECEIVED FEB 1 0 1988

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE 2-FEB-88
WEEKLY MONITORING PERIOD.............................. 6-JAN TO 26-JAN-88

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED... 93
NO. OF PROBES MONITORED... 76

NO. OF PROBES WITH NO METHANE....................................... 74
NO. OF PROBES WITH TRACE TO 4.9% METHANE........................... 2
NO. OF PROBES WITH 5 TO 15% METHANE................................ 0
NO. OF PROBES WITH >15% METHANE.................................... 0

NO. OF PROBES REQUIRING MAINTENANCE................................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

#6C TRACE TO 4.9% METHANE

#26 TRACE TO 4.9% METHANE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES, INC.

GROVESPRING ASSOCIATES. INC.
(213) 377-8753

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	12-31	1-6	1-12	1-19	1-26
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0	0.2	0	0	0.2
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	1.25	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	12-31	1-6	1-12	1-19	1-26
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	10	3	0	1.25
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	12-31	1-6	1-12	1-19	1-26
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE	25-NOV-87
WEEKLY MONITORING PERIOD	3-NOV TO 25-NOV-87

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED	93
NO. OF PROBES MONITORED	76
NO. OF PROBES WITH NO METHANE	76
NO. OF PROBES WITH TRACE TO 4.9% METHANE	0
NO. OF PROBES WITH 5 TO 15% METHANE	0
NO. OF PROBES WITH >15% METHANE	0
NO. OF PROBES REQUIRING MAINTENANCE	0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

NONE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES. INC.
(213) 377-8753

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	10-27	11-3	11-10	11-17	11-25
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0.2	0	0.2	0.2	0
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	10-27	11-3	11-10	11-17	11-25
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	7	0	0	0	0
26A	0	0	0	0	0
27	0.75	4	0	8	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	3	0
31A	0	2	3	0	0
32	0	0	0	0	0
32A	0.25	8	7	12	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	10-27	11-3	11-10	11-17	11-25
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE..5-OCT-87
WEEKLY MONITORING PERIOD................................1-SEP TO 29-SEP-87

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED..93
NO. OF PROBES MONITORED..76

NO. OF PROBES WITH NO METHANE......................................75
NO. OF PROBES WITH TRACE TO 4.9% METHANE............................1
NO. OF PROBES WITH 5 TO 15% METHANE.................................0
NO. OF PROBES WITH >15% METHANE.....................................0

NO. OF PROBES REQUIRING MAINTENANCE.................................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

6C TRACE TO 4.9% METHANE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

GROVESPRING ASSOCIATES, INC.

Report Prepared By:

GROVESPRING ASSOCIATES. INC.
(213) 377-8753

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	9-1	9-9	9-15	9-22	9-29
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0.1	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0.25	0.2	0.25	0.25	0.25
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	9-1	9-9	9-15	9-22	9-29
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	9-1	9-9	9-15	9-22	9-29
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

GROVESPRING ASSOCIATES, INC.

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE..8-SEP-87
WEEKLY MONITORING PERIOD..................................7-AUG TO 25-AUG-87

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED..93
NO. OF PROBES MONITORED..76

NO. OF PROBES WITH NO METHANE....................................75
NO. OF PROBES WITH TRACE TO 4.9% METHANE..........................1
NO. OF PROBES WITH 5 TO 15% METHANE...............................0
NO. OF PROBES WITH >15% METHANE...................................0

NO. OF PROBES REQUIRING MAINTENANCE...............................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

#6C TRACE TO 5% METHANE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

GROVESPRING ASSOCIATES, INC.

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	7-28	8-4	8-11	8-18	8-25
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0	0	0.25	0.25	0.25
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	7-28	8-4	8-11	8-18	8-25
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	7-28	8-4	8-11	8-18	8-25
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE...3-AUG-87
WEEKLY MONITORING PERIOD.................................6-JUL TO 28-JUL-87

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED...93
NO. OF PROBES MONITORED...76

NO. OF PROBES WITH NO METHANE...................................76
NO. OF PROBES WITH TRACE TO 4.9% METHANE........................0
NO. OF PROBES WITH 5 TO 15% METHANE.............................0
NO. OF PROBES WITH >15% METHANE.................................0

NO. OF PROBES REQUIRING MAINTENANCE.............................0

SEE EXHIBIT A FOR TABLE OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

NONE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES. INC.
(213) 377-8753

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	6-27	7-6	7-14	7-21	7-28
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	0	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	.25	0	0	0	0
6C	.25	0.25	0.25	0.20	0
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0.20	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	6-27	7-6	7-14	7-21	7-28
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	NRD	0	0	0	0
35	NRD	0	0	0	0
36B	NRD	0	0	0	0
37	NRD	0	0	0	0
38	NRD	0	0	0	0
38B	NRD	0	0	0	0
39	0	0	0	0	0
40	NRD	0	0	0	0
41	NRD	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	6-27	7-6	7-14	7-21	7-28
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	NRD	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

NRD = PROBE NOT READ

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

EXECUTIVE SUMMARY

GAS PROBE MONITORING AT
HEWITT LANDFILL

REPORT DATE..12-MAY-87
WEEKLY MONITORING PERIOD..................................11-APR TO 24-APR-87

SUMMARY, END OF REPORT PERIOD

NO. OF PROBES INSTALLED..93
NO. OF PROBES MONITORED..85

NO. OF PROBES WITH NO METHANE..85
NO. OF PROBES WITH TRACE TO 4.9% METHANE.............................0
NO. OF PROBES WITH 5 TO 15% METHANE..................................0
NO. OF PROBES WITH >15% METHANE......................................0

NO. OF PROBES REQUIRING MAINTENANCE..................................0

SEE EXHIBITS A-E FOR TABLE & PLOTS OF FLARE OPERATING CONDITIONS.

PROBES CONTAINING METHANE, END OF REPORT PERIOD

NONE

PROBES REQUIRING MAINTENANCE, END OF REPORT PERIOD

NONE

* * * * *

Report Prepared By:

GROVESPRING ASSOCIATES, INC.
(213) 377-8753

GROVESPRING ASSOCIATES, INC.

EXHIBIT A (Continued)

HEWITT LANDFILL

3. ALL PROBES

MONITORING DATE	3-17	3-24	4-11	4-17	4-24
PROBE NUMBER					
HOUSE	0	0	0	0	0
OFFICE	0	0	0	0	0
STORAGE	0	0	0	0	0
1	0	0	0	0	0
1A	0	0	0	0	0
2	0	0	0	0	0
2A	0	0	0	0	0
3B	0	0	1	0	0
4	0	0	0	0	0
4A	0	0	0	0	0
5	0	0	0	0	0
5A	0	0	0	0	0
6B	0	0	0	0	0
6C	0.2	0.2	0	0	0
6D	0	0	0	0	0
7	0	0	0	0	0
7A	0	0	0	0	0
8A	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
10A	0	0	0	0	0
11B	0	0	0	0	0
12B	0	0	0	0	0
13A	0	0	0	0	0
13X	0	0	0	0	0
14B	0	0	0	0	0
14C	0	0	0	0	0
15A	0	0	0	0	0
16A	0	0	0	0	0
16X	0	0	0	0	0
17A	0	0	0	0	0
18B	0	0	0	0	0
19	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-17	3-24	4-11	4-17	4-24
PROBE NUMBER					
20	0	0	0	0	0
20A	0	0	0	0	0
22	0	0	0	0	0
22A	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
24A	0	0	0	0	0
25	0	0	0	0	0
25A	0	0	0	0	0
26	0	0	0	0	0
26A	0	0	0	0	0
27	0	0	0	0	0
27A	0	0	0	0	0
28	0	0	0	0	0
29B	0	0	0	0	0
29C	0	0	0	0	0
30A	0	0	0	0	0
31	0	0	0	0	0
31A	0	0	0	0	0
32	0	0	0	0	0
32A	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0
36B	0	0	0	0	0
37	0	0	0	0	0
38	0	0	0	0	0
38B	0	0	0	0	0
39	0	0	0	0	0
40	0	0	0	0	0
41	0	0	0	0	0
42	0	0	0	0	0

(Continued on next page)

EXHIBIT A (Continued)

HEWITT LANDFILL

ALL PROBES (Continued)

MONITORING DATE	3-17	3-24	4-11	4-17	4-24
PROBE NUMBER					
43	0	0	0	0	0
44A	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
B1B	0	0	0	0	0
B1C	0	0	0	0	0
B2B	0	0	0	0	0
B2C	0	0	0	0	0
B3B	0	0	0	0	0
B3C	0	0	0	0	0
B4B	0	0	0	0	0
B4C	0	0	0	0	0
B5B	0	0	0	0	0
B5C	0	0	0	0	0
B6B	0	0	0	0	0
B6C	0	0	0	0	0
B7B	0	0	0	0	0
B7C	0	0	0	0	0
B8B	0	0	0	0	0
B8C	0	0	0	0	0

Report Prepared By:

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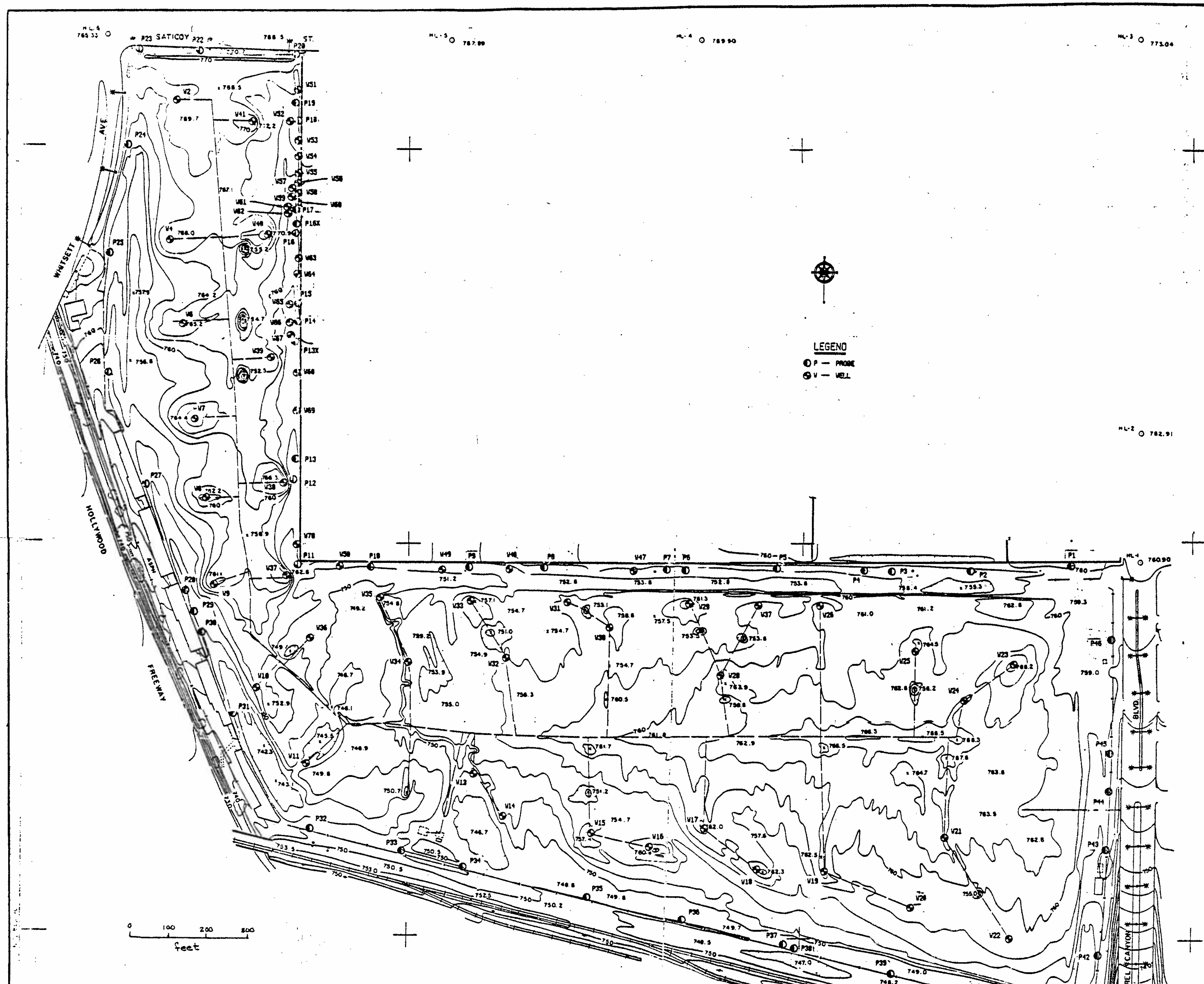
GROVESPRING ASSOCIATES, INC.

APPENDIX B

SOLID WASTE ASSESSMENT TEST SITE PLAN
Hewitt Landfill
(Drawing E-1032-01-16-0223)



SCALE	1"=100'
DRAWN	J.E.
CHECKED	L.E.D.
APPROVED	

MANDEVILLE & ASSOCIATES
environmental engineering services

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DESCRIPTION: SOLID WASTE ASSESSMENT TEST SITE PLAN

LOCATION	CUSTOMER	FILED AS
HEWITT LANDFILL	CALMAT PROPRETIES CO.	-

REV.	DATE	DESCRIPTION	DWN.	PROJ. NO.	DRAWING NO.	REV.	SHT.	DATE
				7A-1032-01	E-1032-01-16-0223	0	1 OF 1	6/15/88

2166-01286

APPENDIX C

ARB SAMPLING AND ANALYTICAL METHODS

December 1985

AIR RESOURCES BOARD
PROCEDURE FOR THE SAMPLING AND ANALYSIS OF ATMOSPHERIC VINYL CHLORIDE

Method 101

Haagen-Smit Laboratory Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

Procedure for the Sampling and Analysis
of Atmospheric Vinyl Chloride
Method 101

1 Introduction

1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of vinyl chloride (chloroethene, vinyl chloride monomer) in the range of 0.002 to 1.0 parts per million (ppm).

1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.

1.3 Higher concentrations may be analyzed by direct injection of a diluted sample into a sample loop of a gas chromatograph.

2. Method

2.1 Air parcels are sampled into a Tedlar bag at a constant rate during selected time intervals with an automatic sampler.

2.2 A portion of the air sample is transferred by syringe to the heated volumetric sample loop or freeze-out trap of a gas chromatograph (GC).

2.3 The sample is introduced into the chromatograph by means of a gas injection valve and analyzed by a flame ionization detector.

2.4 The GC data system quantifies the vinyl chloride by intergrating the peak area and calculating concentration from a factor determined during calibration with a vinyl chloride standard.

3 Apparatus

3.1 A sampler capable of sampling at a rate of 30-40 mL/min is used. The sampler has a diaphram pump, flow metering valves, fittings and tubing to convey air samples to sample bags, timers, solenoid valves and associated electrical circuitry to control filling of the sample bags, all compactly mounted on a metal chasis operating on 110 VAC.

3.2 Tedlar bags, 2 mil thick, nominally of 30 to 100 liter capacity, and equipped with Quick-Connect fittings are used to contain the sample. The bags are prepared in conformity with the ARB document, "Procedure for the Fabrication and Testing of Sample Bags" (see Appendix B). For sampling, the bags are placed in rigid opague containers to protect their contents from sunlight.

3.3 A gas chromatograph equipped with a gas injection valve and loop/freeze-out inlet system is required. A flame ionization detector is used.

3.4 A stainless steel column (2 meters x 1/8 in. O.D.) packed with 0.19% picric acid on 80/100 mesh Carbopac C or other column is used which is capable of resolving vinyl chloride from other organics with similar physical / retention properties.

3.5 An analog recorder and an electronic integrator to quantify peak areas are required.

3.6 Ground glass syringes (100 mL capacity) or other suitable devices are needed to transfer air samples from Tedlar bags to the sample inlet of the GC.

4 <u>Reagents</u>

4.1 All gases used to support the GC analysis shall be of the highest commercially purity available.

4.2 Helium shall have a minimum purity of 99.995%.

4.3 Hydrogen shall have a minimum purity of 99.995%.

4.4 Oxygen or zero air shall have a minimum purity of 99.6%.

4.5 A NBS traceable vinyl chloride standard reference material is used for calibration.

5 <u>Procedure</u>

5.1 All bags and samplers are prepared for sampling as outlined in Appendix A, "Procedure for Atmospheric Tedlar Bag Sampling".

5.2 The air sample is analyzed for vinyl chloride by using either the loop method or the freeze-out method. The freeze-out method is used for the lower vinyl chloride concentrations.

5.2.1 The procedure for the loop method follows:

5.2.1.1 The air sample is transferred from the air sample bag and injected into the sample loop of the gas chromatograph by means of a 100 mL syringe fitted with a Luer-Lok to a Quick-Connect adaptor.

5.2.1.2 The gas sampling valve is equipped with a 1 mL loop.

5.2.1.3 The gas sampling valve is rotated, and the sample enters the GC for analysis.

5.2.1.4 With the picric acid/Carbopac C column, typical operating conditions for the gas chromatograph are:

25 mL/min helium carrier gas flow
30 mL/min hydrogen gas flow to the detector
300 mL/min air flow to the detector
50 deg C sample valve temperature
175 deg C detector temperature
40 deg C isothermal column temperature.

5.2.1.5 Concentrations of vinyl chloride are calculated by an electronic integrator or by any other suitable electronic integration device.

5.2.2 The procedure for the freeze-out method follows:

5.2.2.1 Immerse the sample trap in liquid nitrogen (LN_2) and allow the temperature to stabilize.

5.2.2.2 After discarding about 50 mL of the sample, withdraw exactly 100 mL from the sample bag with a 100 mL syringe and transfer the sample into the trap.

5.2.2.3 Back fill the syringe with another 20 mL of helium and flush the 20 mL through the trap; then flush helium through the trap for 3 minutes at 100 mL/min.

5.2.2.4 Isolate the cryogenic trap by using an "isolation valve" which allows the carrier gas to by-pass the trap.

5.2.2.5 Replace the LN_2 Dewar with a Dewar containing hot water at about 80 deg C.

5.2.2.6 Allow all the ice to melt from the trap.

5.2.2.7 Using the isolation valve, allow the carrier gas stream to flush the sample into the gas chromatograph.

5.2.2.8 The instrument operating conditions are similar to those described in Section 5.2.1.4 above.

5.2.2.9 Concentrations of vinyl chloride are calculated by measuring the area of the sample peak by an electronic integrator.

6 Calculations

6.1 The vinyl chloride (monomer) concentration in ppm is calculated by using the external standard method,

$$\text{Concentration}_i = \text{Area} \times \text{Calibration Factor}$$

6.2 The calibraion factor (CF) is calculated during calibration by the equation:

$$CF = Conc/Area$$

6.3 Replicate calibrations are averaged, and the arithmetic mean is stored as the CF to be used in subsequent analyses. Concentrations may be converted from ppm to mg/m^3 by means of the following formula:

$$mg/m^3 = ng/cm^3 = \frac{(P)x(62.5)x(10^3)x(ppm)}{(82.07)(T)}$$

where
P = pressure in atmospheres
62.5 = molecular weight of vinyl chloride, g/mol
82.07 = gas constant in cm^3 x atm/ deg.mol
T = absolute temperature (deg K)

6.4 The concentration unit of mg/m^3 is equivalent to ng/cm^3.

7 Quality Control

7.1 Quality control procedures are required in two areas: sampling and analysis.

7.1.1 The Tedlar bag samplers are checked every 6 months for leakage and contaimination. The interval is shortened if any malfunction is suspected. A written record is maintained of the history of each sampler. (See Appendix A.)

7.1.2 The Tedlar bags are checked for leakage and contamination before being used for sampling. A log book is maintained with a complete history of bag usage. (See Appendix B.)

7.2 Calibrations are performed as follows:

7.2.1 A NBS traceable reference material of 1 ppm vinyl chloride in nitrogen is used to calibrate the gas chromatograph.

7.2.2 Any secondary standards prepared from the reference standard must show the same response factor as the original reference standard.

7.2.2.1 The working standard must be validated by comparison with the reference standard.

7.2.2.2 A quality assurance audit of the standards must be performed annually.

7.2.2.3 Additional standards of lower concentrations of vinyl chloride in nitrogen are prepared at one-half, one-tenth, one-hundredth and one-thousandth the labeled value using the appropriate diluted standard: Three independent analyses of the standard are performed on each instrument to obtain zero-span checks.

7.2.3 Linearity is checked in the following manner:

7.2.3.1 A gas chromatograph linearity check is performed annually with standards of at least 4 different concentrations and 4 replicate runs for each concentration. The concentrations must bracket the anticipated range of sample concentrations.

7.2.3.2 The mean-square error due to lack of fit about the regression line is compared to the total mean-square error of the independent replicates about their individual means. The calibration is accepted if the F-ratio is less than the 95% rejection limit.

7.2.3.3 A repeated calibration should not differ from the previous calibration by more than 10%.

7.2.3.4 Any region of concentration that deviates more than 5% from the least square line is considered nonlinear.

7.2.3.5 The samples must be analyzed only in the linear range.

7.2.4 Analyzers are calibrated daily.

7.2.4.1 The daily calibration consists of at least two calibration points bracketing the anticipated sample concentrations.

7.2.4.2 The calibration is repeated if either the slope or the response at the limit of detection (LOD) of the fitted line changes by more than 5%. If the calibration fails on both runs, a full multipoint calibration should be performed.

7.2.4.3 Blank samples should be run between calibrations and samples.

7.2.5 Limit of detection parameters are:

7.2.5.1 The limit of detection (LOD) is based on three standard deviations (SD) of runs near the LOD (within 10 SD of the LOD: Ref. 9.3).

7.2.5.2 The LOD should be determined at least on an annual basis.

7.2.5.3 If the LOD changes by more than 10%, the instrument must be checked and the LOD redetermined.

7.2.5.4 The presence in a sample of large adjacent peaks will often raise the LOD in that sample.

7.3 The quality control procedures used during the analytical process are:

7.3.1 Column parameters are checked.

7.3.1.1 All GC accessible parameters should be logged when a column is first installed. These parameters should be checked daily and recorded.

7.3.1.2 The efficiency and resolution of the column should be checked every month. If the tests show more than a 10% change, the oolumn needs replacement.

7.3.1.3 If the head pressure required to maintain a specified flow through the column increases by more than 100%, the column needs replacement.

7.3.1.4 If a drift in retention time should occur, a peak misidentification would result. Instrument parameters need constant monitoring.

7.3.2 Replicate analyses are performed to demonstrate data validity.

7.3.2.1 A duplicate analysis must be performed on at least one sample per day.

7.3.2.2 If the duplicate analysis differs by more than 20% and if the concentration of the sample is higher than three times the LOD, then an additional analysis is needed.

7.3.2.3 If the range of replicate analyses is more than 20% of the mean and if the concentration of the sample is greater than three times the LOD, the analysis is not acceptable.

7.3.2.4 If the range is within 20%, the mean and the standard deviation are reported.

7.3.3 Spiked samples are used to verify the compound peak and to define the accuracy and precision of the procedure.

7.3.3.1 At least 20% of the samples are spiked with standards and reanalyzed.

7.3.3.2 If the analysis of the sample and the spiked sample differ from the expected concentrations by more than 20%, the analysis is not acceptable.

7.3.3.3 If there is any reason to suspect the presence of an interferent (peak broadening, shift of retention time, shoulder formation, etc.), peak identification should be verified using another analyzer - gas chromatograph / mass spectrometer (GC/MS) - or different column. The peak height and peak area ratios of the spiked and unspiked samples should be similar.

7.3.4 Compound confirmation is a part of quality control.

7.3.4.1 Ten percent of the analyses are to be confirmed by a different analytical system (different column or different detector, e.g. GC/MS).

7.3.4.2 If the confirmatory and the routine analyses differ by more than 20%, the analysis is not acceptable.

7.4 The quality control procedures used in formulating the analysis report are:

7.4.1 Data storage: raw data from the integrators are stored unmodified in electronic medium. Data are archived according to date, site, analyses, and project for easy retrieval. These data are kept for 3 years.

7.4.2 All data above the minimum detection limits are reported to the requesting agency in hard copy or electronic format.

7.4.3 All reports are reviewed by at least two qualified staff members before they are released.

8 <u>Critique and Comment</u>

8.1 The minimum measurable concentration of vinyl chloride monomer was determined to be less than 0.001 ppm (+/- 0.002 ng/cm^3) using the prescribed instrument conditions and pre-concentrating by freezing a 100 mL sample.

8.2 Any organic compound present in the sample having a retention time very similar to that of vinyl chloride under the operating conditions described in this method is an interferrence. Absolute proof of chemical identity requires confirmation by other means.

8.3 Water vapor in the sample does not interfere with the separation and quantification of vinyl chloride.

8.4 The air sampling equipment is easily set-up and involves no liquids. The concentration of vinyl chloride monomer in the range of interest is stable for at least one week in the Tedlar sampling bags, provided that no ozone is present.

8.5 The sample is easily and repeatably introduced into the instrument by means of a volumetric gas sampling valve.

8.6 A representative composite sample is readily obtained for any selected ime interval, because the equipment samples at a constant rate.

9 References

9.1 Burghardt, E., Jelton, R., Van Dowiel, H. J., and Oranje, E. J., Atmospheric Envirion. Vol. 13, 1057 (1979).

9.2 White, L. D., Taylor, D. C., Manuer, P. A. and Kupel, R. E., Am. Ind. Hyg. Assn. J., 31, 225 (1970).

9.3 Winefordner, J.D. and Long, G. L., Anal. Chem., 55, 712A (1983).

9.4 Bennett, C.A. and Franklin, N. L. (1954), "Statistical Analysis in Chemistry and the Chemical Industry", John Wiley & Sons, Inc., New York, pp. 222-232.

9.5 Draper, N. R. and Smith, H. (1966), "Applied Regression Analysis", John Wiley & Sons, Inc., New York, p. 30.

9.6 Purnell, H (1962), "Gas Chromatography", John Wiley & Sons, Inc., New York, pp. 301-302.

9.7 U. S. Environmental Protection Agency (1976), "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I - Principles", EPA-600/9-76-005 Environmental Monitoring and Support Laboratory, Research Triangle Park, North Carolina 27711.

CAUTION; Laboratory operations involving carcinogens

Because vinyl chloride has been identified as a human carcinogen, observe appropriate precautions when handling this gas. The OSHA regulations pertaining to the use and handling of vinyl chloride may be found in 29 CFR 1910.93q (Section 1910 93q in Title 29 of the Code of Federal Regulations available in the Federal Register, Vol. 39, No. 194, Friday, October 4,1974, pp.35890-35898)..

October 1986

AIR RESOURCES BOARD
PROCEDURE FOR THE SAMPLING AND ANALYSIS OF ATMOSPHERIC BENZENE

Method 102
Revision 1

Haagen-Smit Laboratory Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

Procedure for the Sampling and Analysis of Atmospheric Benzene Method 102

1 Introduction

1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of benzene in the range of 0.5 to 1000 parts per billion (ppb).

1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.

1.3 Higher concentrations may be analyzed by direct injection of a sample into a sample loop of a gas chromatograph.

2 Method

2.1 Air is sampled into a Tedlar (polyvinyl fluoride) bag at a constant rate (20 to 40 mL/min) during selected time intervals by means of an automatic sampler.

2.2 After sampling, the ambient air bag sample is returned to the laboratory for analysis.

2.3 The sample is introduced into the gas chromatograph (GC) sample stream by means of gas injection valves and analyzed by a photoionization detector.

2.4 The GC data system quantitates benzene by integrating the peak area and calculating the concentration from factors determined during calibration with standards.

3 Apparatus

3.1 The sampler system consists of a diaphragm pump with a by-pass flow constrictor, a solenoid valve, a flow meter with a flow control valve, pressure regulator, fittings, and tubing to convey air samples to the Teflon bag. The entire assembly, including a 7-day timer and associated electrical circuitry to control the filling of the sample bags, is compactly mounted on a metal chassis and operates on a 110 VAC power supply.

3.2 Tedlar bags, 2 mil thickness, 50 liter capacity, equipped with stainless steel quick disconnect fittings are used to contain the sample. The bags are prepared in conformity with the ARB document, "Procedure for Fabrication and Testing of Sample Bags", (see Appendix B). For sampling, the bags are placed in rigid opaque containers to protect their contents from the sunlight.

3.3 A gas chromatograph equipped with a gas sampling valve and either a sample loop or freeze-out inlet system and a photoionization detector is required. The detector operates at 10.2 eV.

3.4 A freeze-out system consisting of a U-shaped stainless steel trap filled with stainless steel clippings is used to concentrate the sample.

3.5 A stainless steel column (6 ft x 1/8 in) packed with 10% N,N-bis(2-cyanoethyl)formamide on 100/120 mesh Chromosorb PAW is used.

3.6 For a confirmation of the benzene analysis, an alternate column should be used such as a stainless steel GC column packed with 10% tricyanoethoxy propane (TCEP).

3.7 An analog recorder and an electronic integrator to quantify peak areas are required.

3.8 Ground glass syringes (100 mL capacity) or other suitable devices are needed to transfer air samples from the Tedlar bag to the GC sample inlet.

4 Reagents

4.1 The primary standard used in this analysis should be the National Bureau of Standards (NBS) benzene standard reference material.

4.2 Helium with a minimum purity of 99.995% should be used.

4.3 Commercial liquid nitrogen (b.p.=-196°) is used to cool freeze-out trap.

5 Procedure

5.1 All bags and samplers are prepared for sampling as outlined in Appendix A, "Procedures for Atmospheric Bag Sampling".

5.2 The air sample is analyzed for benzene by using either the loop method or the freeze-out method. The freeze-out method is used for lower benzene concentrations of less than 25 ppb.

5.2.1 The procedure for the loop method follows:

5.2.1.1 Transfer the air sample from the air sample bag and inject it into the sample loop of the gas chromatograph using a 100 mL syringe fitted with a Luer-lok to quick-connect adapter.

5.2.1.2 The gas sampling valve has a fixed volume sample loop of about 1 mL.

5.2.1.3 Rotate the gas sampling valve. This causes the sample to enter the gas chromatographic analyzer.

5.2.2 The procedure for the freeze-out method follows:

5.2.2.1 Immerse the sample trap in liquid nitrogen (LN_2) and allow the temperature to stabilize (approximately 5 min).

5.2.2.2 After flushing the syringe with about 40 mL of the sample withdraw exactly 40 mL from the sample bag with the syringe.

5.2.2.3 Transfer the sample into the trap.

5.2.2.4 Backfill the syringe with 40 mL of helium and flush the 40 mL through the trap; then flush helium through the trap for 2 minutes at 100 mL/min.

5.2.2.5 Stop the helium flushing process.

5.2.2.6 Isolate the cryogenic trap by using the isolation valve, which prevent the escape of the sample.

5.2.2.7 Remove the LN_2 Dewar from the trap and replace it with a Dewar containing hot water at about 80 degC.

5.2.2.8 Allow the trap to warm up.

5.2.2.9 Actuate the sampling valve, thereby causing the carrier gas stream to flush the sample into the gas chromatograph.

5.3 With the suggested stainless steel column (see item 3.5), typical operating conditions for both loop and freeze-out methods are:

Helium flow:	20 mL/min
Heating bath temperature for cryogenic trap:	80 degC
Column temperature:	ambient
Detector temperature:	150 degC

5.4 Concentrations of benzene may be calculated by using a chromatographic data system or any other suitable electronic integrating device.

6 Calculation

6.1 The benzene concentration in ppb is calculated by the data system using the external standard method:

Concentration = Area x Calibration Factor

6.2 The calibration factor (CF) is calculated during calibration by the equation,

$$CF = \frac{conc}{Area}$$

The replicate calibrations are averaged and the arithmetic mean is stored as the CF to be used in subsequent analyses.

6.3 Concentrations may be converted from ppb to ug/m^3 by using the following formula:

$$ug/m^3 = \frac{(P) \times (MW) \times (ppb) \times (10^3)}{(82.05) \times (T)}$$

where: P = pressure in atmospheres

MW = molecular weight of benzene, 78.11 g/mole

82.05 = gas constant, $\frac{cm^3 \times atm}{mol \times T}$

T = absolute temperature, degK

7 <u>Quality Control</u>

7.1 Quality control procedures are managed in two areas: sampling and analysis.

7.2 The sampling procedures use the following protocol:

7.2.1 The Tedlar bag samplers are checked every six months for leakage and contamination. The interval is shortened if any malfunction is suspected. A written record is maintained of the history of each sampler. (See Appendix A).

7.2.2 The Tedlar bags are checked for leakage and contamination before being used for sampling. A log book is maintained with a complete history of bag usage. (See Appendix B).

7.3 The analytical procedures use the following protocol:

7.3.1 Calibrations are performed periodically. Accuracy of the method cannot be determined without an accepted standard reference material (SRM) and independent accuracy evaluation.

7.3.1.1 An NBS traceable reference material of 0.25 ppm (parts per million) benzene in nitrogen is used to monitor the concentration of a secondary working standard.

7.3.1.2 Any secondary standards prepared from the reference standard must show the same response factor as the original reference standard. Intercomparisons are made on a monthly basis.

7.3.1.3 A working standard, prepared by diluting an NBS reference material of about 10 ppm to about 10 ppb, is generally used for daily calibrations.

7.3.1.4 The stability of working standards must be such that there is less than a 10% change in thirty days.

7.3.1.5 There shall be at least one working standard whose concentration lies within the interval of 5 to 20 ppb.

7.3.1.6 A second working standard of a higher concentration shall be prepared for use in two point calibrations.

7.3.1.7 A quality assurance audit of the standards is prepared annually.

7.3.2 Calibrations are performed on a daily schedule.

7.3.2.1 The daily calibration consists of at least two calibration points bracketing the anticipated sample concentrations.

7.3.2.2 The calibration is repeated if either the slope or the response at the limit of detection (LOD) of the fitted line changes by more than 5%. If the calibration fails on both runs, an NBS 0.25 ppm reference standard is used to validate the calibration.

7.3.2.3 If the lamp voltage is adjusted, allow time for the lamp to stabilize and repeat the calibration.

7.3.2.4 A record is kept of the lamp voltage settings and all preventative maintenance procedures i.e. lamp replacements, cleaning of lamp windows.

7.3.2.5 Blank samples are run daily between calibrations and sample analyses as necessary.

7.3.2.6 A single point span calibration may be substituted for the two point calibration procedure for a maximum of four consecutive days provided the response factor does not change by more than 10% during the time interval.

7.3.3 Linearity is a factor that is checked periodically.

7.3.3.1 A gas chromatographic linearity check is performed annually with standards of at least 4 different concentrations and 4 replicate runs for each concentration. The concentrations must bracket the anticipated range of sample concentrations.

7.3.3.2 The mean-square error due to lack of fit about the regression line is compared to the total mean-square error of the independent replicates about their individual means. The calibration is accepted if the F-ratio is less than the 95% rejection limit.

7.3.3.3 Any region of concentration that deviates more than 5% from the least square line is considered nonlinear.

7.3.3.4 Samples must be analyzed only in the linear range.

7.3.4 Limits of detection must be established.

7.3.4.1 The limit of detection (LOD) is based on three standard deviations (SD) of runs near the LOD (within 10 SD of the LOD, Winefordner and Long, 1983).

7.3.4.2 The LOD should be determined at least on an annual basis.

7.3.4.3 If the benzene calibration factor changes by more than 10%, The instrument must be checked and the LOD redetermined.

7.3.4.4 The presence in a sample of a compound producing in the chart display very large adjacent peaks will often raise the LOD in that sample.

7.3.5 GC column condition parameters should be checked and documented.

7.3.5.1 All GC accessible parameters should be logged when a column is first installed. These parameters should be checked daily and recorded on integrator reports.

7.3.5.2 The efficiency and resolution of the column should be checked every thirty days. If the tests show more than a 10% change the column needs replacement.

7.3.5.3 If the headpressure required to maintain a specified flow through the column increases by more than 100%, the column needs replacement.

7.3.5.4 If the drift of retention times of the peaks results in peak misidentification, all instrument parameters need to be checked.

7.3.6 Replicate analyses are performed regularly.

7.3.6.1 A duplicate analysis is performed on at least one sample each day.

7.3.6.2 If the duplicate analysis differs by more than 20%, and if the concentration of the sample is higher than 3X LOD, then an additional analysis is needed.

7.3.6.3 If the relative standard deviation (RSD) of the replicate analyses is greater than 15% and if the concentration of the sample is greater than 3 x LOD, none of the analyses for that day are acceptable.

7.3.6.4 If the range is within 20%, the mean and the standard deviation are reported.

7.3.7 Compound confirmation is a quality control procedure.

7.3.7.1 Ten percent of the analyses are to be confirmed by a different analytical system (different column or alternate detector, e.g. GC/MS).

7.3.7.2 If the confirmatory and the routine analyses differ by more than 20%, none of the analyses for that day are acceptable.

7.3.8 Analytical reports are filed.

7.3.8.1 Data storage: peak area and compound concentration data are stored unmodified in the electronic storage. Data are archived according to date, site, analysis, and project for easy retrieval. These data are kept for three years in the laboratory electronic storage.

7.3.8.2 All data above the minimum detection limits are reported to the requesting agency in hard copy or electronic format.

7.3.8.3 All reports are reviewed by at least two qualified staff before they are released.

8 <u>Critique and Comments</u>

8.1 The minimum measurable concentration of benzene has been determined to be 0.5 ppb using prescribed instrument conditions i.e. 40 mL sample, cryogenic trap.

8.1.1 Table 8.1.1 lists the lower limits of detection for the method and its associated statistics

8.2 The range of benzene measurement is 1.0 to 1000 ppb. The upper limit may be expanded by extending the calibration range, by diluting the sample, or by reducing the sample volume.

8.3 Any organic compound present in the sample having a retention time similar to that of benzene under the operating conditions described in this method may interfere with the quantification. Proof of chemical identity for benzene requires confirmation by other means.

8.3.1 Benzene is positively identified by means of a gas chromatograph/mass spectrometer.

8.4 Advantages and disadvantages of Method 102 are listed below:

8.4.1 The air sampling equipment is easily set up and involves no liquids. The ambient concentrations of benzene are are stable for at least 24 hours in the Tedlar sampling bags if the sampling bags are kept away from direct sunlight and are not exposed to temperatures greater than 90°F.

8.4.2 A representative integrated sample is readily attainable because the equipment samples at a constant rate.

8.4.3 The sample is easily and repeatedly introduced into the GC by using a volumetric gas sampling valve or cryogenic trap.

8.4.4 The lower concentration limit of the analysis may be extended by concentrating the sample by freezing out a larger volume of the sample.

8.4.5 The polyvinyl fluoride (Tedlar) film sample bag is susceptible to leaks and permeation through the bag.

8.4.6 The sample is susceptible to contamination when it passes through the sampling system.

9 References

9.1 Bennett, C. A. and Franklin, N. L., "Statistical Analysis in Chemistry and the Chemical Industry", pp. 222-232, John Wiley & Sons, Inc., New York (1954).

9.2 Draper, N. R. and Smith, H., "Applied Regression Analysis", p.30, John Wiley & Sons, Inc., New York (1966).

9.3 Purnell, H., "Gas Chromatography", pp. 301-302, John Wiley & Sons, Inc., New York (1962).

9.4 U. S. Environmental Protection Agency, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I - Principles", Research Triangle Park, North Carolina 27711 (1976).

9.5 Winefordner, J. D. and Long, G. L., Anal. Chem., 55, 712A (1983).

TABLE 8.1.1
LIMITS OF DETECTION

Compound	Limit of Detection ppb	Concentration ppb	Mean Area	Area St. Dev.	n	% Rel St. Dev.
Benzene	0.5	0.5	2710	282	7	10.4

September 1986

AIR RESOURCES BOARD
PROCEDURE FOR THE SAMPLING AND ANALYSIS OF ATMOSPHERIC C_1 TO C_2 HALOGENATED HYDROCARBONS

Method 103
Revision 1

Haagen-Smit Laboratory Division
State of California
Air Resources Board
9528 Telstar Avenue
El Monte, CA 91731

Procedure for the Sampling and Analysis
of Atmospheric C_1 to C_2 Halogenated Hydrocarbons
Method 103

1 Introduction

1.1 This procedure describes a method of sampling and analyzing atmospheric concentrations of C_1 to C_2 halogenated hydrocarbons in the range of 0.004 to 1.0 parts per billion (ppb).

1.2 Lower concentrations may be analyzed by increasing the sample volume and using a cryogenic trap to concentrate the sample.

1.3 Higher concentrations may be analyzed by direct injection of a diluted sample into a sample loop of a gas chromatograph.

1.4 Compounds which can be analyzed by this method are:

1.4.1 Dichloromethane, CH_2Cl_2, (methylene chloride)

1.4.2 Trichloromethane, $CHCl_3$, (chloroform)

1.4.3 1,2-Dichloroethane, $ClCH_2CH_2Cl$, (ethylene dichloride, EDC)

1.4.4 1,1,1-Trichloroethane, Cl_3CCH_3, (methyl chloroform)

1.4.5 Tetrachloromethane, CCl_4, (carbon tetrachloride)

1.4.6 Trichloroethene, $Cl_2C{=}CHCl$, (trichloroethylene, TCE)

1.4.7 1,2-Dibromoethane, $BrCH_2CH_2Br$, (ethylene dibromide, EDB)

1.4.8 Tetrachloroethene, $Cl_2C{=}CCl_2$, (perchloroethylene, PERC)

2 Method

2.1 Air is sampled into a Tedlar bag at a calibrated and controlled flow during selected time intervals as described in Appendix A, "Procedure for Atmospheric Tedlar Bag Sampling".

2.2 A measured volume of the air sample is transferred by a syringe into the chromatograph.

2.3 The components are separated by a specified column and analyzed by an electron capture detector.

2.4 An electronic integrator quantitates the halogenated hydrocarbons by integrating the peak areas and calculating concentrations from a factor determined during calibration with a halogenated hydrocarbons standard mixture.

3 Apparatus

3.1 A sampler with bags is required for each site. The sampler and bags are prepared and operated as described in the "Procedure for Atmospheric Tedlar Bag Sampling".

3.2 A gas chromatograph (GC) equipped with a gas injection valve and freeze-out trap inlet system is required. An electron capture detector is used.

3.3 One GC column is required: A glass column (6 ft x 1/4 in O.D.) packed with 0.2 percent Carbowax 1500 on Supelco 80/100 mesh Carbopac C.

3.4 Other GC supportive apparatus used are a strip chart recorder, a remote controller, and an electronic integrator.

3.5 Ground glass syringes (50, 100, and 250 mL capacity) or other suitable devices to accurately transfer air samples from Tedlar bags to the sample inlet of the GC are used.

3.6 A large air-tight chamber is used to prepare standard gas mixtures.

3.7 The cryogenic traps holding the liquid nitrogen are Dewar containers.

4 Reagents

4.1 All gases used in the GC analysis shall be of the highest commercial quality available.

4.2 Helium shall have a purity of 99.995%.

4.3 Halogenated hydrocarbons reference liquid standards, 99% purity as listed in 1.4 are used to prepare a 10 ppb working standard mixture which is used as a span gas.

4.4 A mixture of 10 percent methane in argon is used as make-up gas in the GC.

4.5 Commercial liquid nitrogen (b.p. = -196°C) is used to cool the freeze-out trap.

5 Procedure

5.1 Bags and samplers are fabricated, tested, and operated as described in Appendix B, "Procedure for the Fabrication and Testing of Sample Bags".

5.2 The air sample is analyzed for C_1 to C_2 halogenated hydrocarbons by using either the loop method or the freeze-out trap method. The freeze-out trap method is used for ppb to ppt (parts per trillion) concentrations.

5.2.1 The procedure for the loop method follows:

5.2.2 The air sample is transferred from the gas sample bag and injected into the sample loop of the GC using a clean 100 mL syringe fitted with a Luer-lok to quick-connect adapter.

5.2.3 The gas sampling valve (rotary type) is equipped with a 1 mL loop.

5.2.4 The gas sampling valve is rotated and the sample enters the GC analyzer and is separated into component compounds.

5.2.5 A Carbowax 1500/Carbopak C column is used to separate the halogenated hydrocarbons. Typical operating conditions for the gas chromatograph are:

25 mL/min helium carrier gas flow
40 mL/min 10% methane in argon make-up flow gas
80°C 10-port valve compartment temperature
150°C injection port temperature
350°C detector temperature
6° to 160°C at 8°C/min programming column temperature
Backflush: 20 min.

5.2.6 Each separated component passes through the electron capture detector and yields a response proportional to its response factor and concentration.

5.2.7 Concentrations of halogenated hydrocarbons may be calculated using an electronic integrator.

5.3.1 The procedure for the freeze-out method follows:

5.3.2 Immerse the sample trap in liquid nitrogen (LN_2) and allow the temperature to stabilize while maintaining a flow of helium through the system.

5.3.3 After discarding about 50 mL of the sample, withdraw exactly 100 mL from the sample bag with a 100 mL syringe and transfer the sample into the trap.

5.3.4 Backfill the syringe with another 40 mL of helium and flush the 40 mL through the trap; then flush the carrier helium through the trap for three minutes.

5.3.5 Isolate the cryogenic trap by using the isolation valve which allows the carrier gas to by-pass the trap.

5.3.6 Replace the LN_2 Dewar flask with a Dewar containing hot water at about 90 deg C.

5.3.7 Allow the trap to warm up.

5.3.8 Inject the sample into the carrier gas stream by turning the GC sampling valve. The gas sample enters the GC analyzer and is separated into component compounds.

5.3.9 The instrument operating conditions are the same as those described in Section 5.2.5 above.

5.3.10 Each separated component passes through the electron capture detector and yields a response proportional to its response factor and concentration.

6 Calculations

6.1 The concentrations of halogenated hydrocarbons, in ppb, are calculated by an electronic integrator using the external standard method.

6.1.1 Concentration = Area x Response Factor x Dilution Factor

6.2 The Response Factor (RF) is calculated during calibration by the equation:

$$RF = \frac{\text{Concentration}}{\text{Area}}$$

6.2.1 $$\text{Dilution Factor} = \frac{\text{Total volume of diluted sample}}{\text{Initial sample volume before dilution}}$$

6.2.2 Replicate calibrations are averaged and the arithmetic mean is stored as the RF for subsequent analyses.

6.3 Concentrations may be converted from ppb to mg/m^3 by means of the following formula:

$$mg/m^3 = \frac{P \times (M.W.) \times (ppb)}{(82.05) \times (T)}$$

Where:

P	=	Pressure in atmospheres
M.W.	=	Molecular weight of corresponding halogenated hydrocarbon
82.05	=	Gas constant in cm^3 x atm./ $^{\circ}K$-mole
T	=	Absolute temperature ($^{\circ}K$).

6.4 The concentration unit mg/m^3 is equivalent to ng/cm^3

7 Quality Control

7.1 Quality control procedures are followed in two areas: sampling and analysis.

7.2 The quality control procedures used in sampling are:

7.2.1 The Tedlar bag samplers are checked every 6 months for leakage and contamination. The interval is shortened if any malfunction is suspected. A written record is maintained of the history of each sampler. (See Appendix A).

7.2.2 The Tedlar bags are checked for leakage and contamination before being used for sampling. A log book is maintained with a complete history of bag usage. (See Appendix B).

7.3 The quality control procedures used in analyzing the sampl[e]s are:

7.3.1 The accuracy of the method has not been determined.

7.3.1.1 Every six to nine months a calibration standard is prepared in a glass-lined Pfaudler Chamber maintained by the Environmental Laboratory Section of the Haagen-Smit Laboratory.

7.3.1.2 The chamber is repeatedly evacuated and flushed with zero air until it is shown by gas chromatographic analysis to be free of any significant contamination.

7.3.1.3 To prepare the standard, the chamber is re-evacuated and filled with zero air to a pressure of 5 psia.

7.3.1.4 A measured volume of a volumetrically prepared solution of halogenated hydrocarbons in methanol is injected via a heated injector into a stream of zero air as it is flowing into the chamber. The volume of the solution injected into the chamber is chosen so as to give the desired gas phase concentration of halogenated hydrocarbons when the chamber is pressurized to 16 psia with zero air.

7.3.2 Calibration standards are prepared periodically. The accuracy of the standard is verified and the procedure validated by comparing the concentration of tetrachloroethene in the chamber to that of an NBS standard.

7.3.2.1 A newly prepared chamber working standard is rejected unless the tetrachloroethene concentration based on calculation agrees within +/- 5% of the value determined by analysis, using the NBS standard for calibration.

7.3.2.2 A newly prepared chamber working standard is rejected unless the relative response factors for all eight halogenated hydrocarbons of interest fall within +/- 10% of the historically established mean values.

7.3.3 A working chamber standard is checked at least every three months for conformity to criteria 7.3.2.1 and 7.3.2.2.

7.3.3.1 A new standard is prepared as frequently as required as determined by the above mentioned criteria.

7.3.3.2 Any reports generated after the standard ceases to be demonstratively within the established tolerances shall contain a cautionary explanation.

7.4 The gas chromatograph is calibrated periodically.

7.4.1 Calibration factors are determined on the basis of the mean values of the previous calibration runs which meet the criteria of 7.4.3.

7.4.2 Each day a calibration check is performed using the Pfaudler chamber standard to span the instrument.

7.4.3 If the response for each compound of interest is within 10% of the established calibration value, the established calibration factors are retained.

7.4.4 The calibration check is repeated if the response of the instrument has changed by more than 10% from the established values.

7.4.5 If the response is still out of tolerance, a quality assurance report is submitted, remedial action is initiated, and new calibration factors calculated.

7.4.6 Blank samples shall be analyzed daily after the calibration is completed and, whenever necessary, between samples.

7.5 The linearity of the instrument is checked periodically.

7.5.1 A gas chromatographic multipoint linearity check is performed annually with standards of at least four different concentrations and four replicate runs for each concentration. The concentrations should include the anticipated range of sample concentrations above the limit of detection.

7.5.2 The mean-square error due to lack of fit about the regression line is compared to the total mean-square error of the independent replicates about their individual means. The calibration is accepted if the F-ratio is less than the 95% rejection limit.

7.5.3 A repeated multipoint calibration should not differ from the previous calibration by more than 10%.

7.5.4 Any region of concentration that deviates more than 5% from the least-square line is considered nonlinear.

7.5.5 Data is reported only for compounds whose concentrations lie in the linear range.

7.6 Limits of detection are established.

7.6.1 The limit of detection (LOD) is based on three standard deviations (SD) of runs near the LOD (within 10 SD of the LOD, Winefordner and Long, 1983).

7.6.2 The LOD should be determined at least on an annual basis.

7.6.3 If the instrument response changes by more than 15%, the instrument must be checked and the LOD redetermined.

7.6.4 The presence in a sample of a very large adjacent peak will often raise the LOD in the sample.

7.7 Analytical instruments have quality control procedures.

7.7.1 Column conditions are checked periodically and as needed.

7.7.1.1 All GC accessible parameters is logged when a column is first installed. These parameters are checked daily and recorded on integrator reports.

7.7.1.2 The efficiency and resolution of the column are checked every month. If the tests show more than a 10% change, the column is replaced.

7.7.1.3 If the headpressure required to maintain a specified flow through the column increases by more than 100%, the column is replaced.

7.7.1.4 If the drift of retention times of peaks results in peak misidentification, all instrument parameters are checked.

7.7.2 Replicate analyses are a quality control procedure.

7.7.2.1 A duplicate analysis is performed on at least one sample per day.

7.7.2.2 If the duplicate analysis (replicate) differs by more than 20%, and if the concentration of the sample is higher than 3X LOD, then an additional analysis is performed.

7.7.2.3 If the range of the replicate analyses is greater than the mean and if the concentration of the sample is greater than 3X LOD, the analyses are not acceptable.

7.7.2.4 If the range is within 20%, the mean and the standard deviation are reported.

7.7.2.5 If there is any reason to suspect the presence of an interferent (peak broadening, shift of retention time, shoulder formation, etc.), peak identification is verified using another analyzer (GC/MS), detector, or column.

7.7.2.6 When spiked samples are analyzed, the peak height and peak area ratios of the spiked and unspiked samples must be consistent.

7.7.3 Compound confirmation is a quality control procedure.

7.7.3.1 Ten percent of the analyses are confirmed by a different analytical system (different column or different detector, e.g. GC/MS).

7.7.3.2 If the confirmatory and the routine analyses differ by more than 20%, none of the analyses are acceptable.

7.8 Analytical reports undergo quality control procedures.

7.8.1 Data storage: raw data transmitted from the integrator are stored unmodified in electronic storage. Data are archived according to date, site, analyses, and project for easy retrieval. These data are kept for 3 years in the laboratory electronic storage.

7.8.2 All data above the minimum detection limits are reported to the requesting agency in hard copy or electronic format.

7.8.3 All reports are reviewed by at least two qualified staff before they are released.

8 <u>Critique and Comments</u>

8.1 Lower limits of detection have been established using the prescribed instrument conditions and using a 100 mL sample with the freeze-out trap technique.

8.1.1 Table 8.1.1 lists the lower limits of detection for the the compounds analyzed by this method.

8.2 Interferences are not usually a serious problem for light halogenated hydrocarbon analysis when the electron capture detector is used.

8.2.1 The electron capture detector is selective for the measurement of halogenated hydrocarbons. It is virtually insensitive to other hydrocarbons thus eliminating interferences from non-halogenated hydrocarbons.

8.2.2 Any halogenated hydrocarbons present in the sample having retention times very similar to the compounds of interest under the operating conditions described in this method will interfere. Therefore, proof of chemical identity requires confirmation.

8.2.3 Water vapor at normal ambient humidity in the sample does not interfere with the separation and quantification of halogenated hydrocarbons.

8.2.4 High concentrations of nitrogen oxides (500 ppm) and sulfur oxides (50 ppm) interfere in the determination of methylene chloride in the samples of stack emission sources.

8.3 The procedure described herein has both advantages and disadvantages:

8.3.1 This method provides a simple way of air sampling. The concentrations of halogenated hydrocarbons in the range of interest are stable for more than 24 hours in the bag, providing sufficient time for the analysis.

8.3.2 The sample is easily and repeatedly introduced into the instrument by means of a gas sampling valve.

8.3.3 A representative composite sample is readily obtained for any selected time interval because the air sampling flow rate is constant.

8.3.4 Both the upper and the lower limits of detection can be extended by concentrating a larger volume of the sample with a freeze-out trap or by diluting the sample in a Tedlar bag with nitrogen or by loop injection.

8.3.5 Interferences can be eliminated by selecting chromatographic conditions.

9 <u>References</u>

9.1 U.S. Environmental Protection Agency (19760, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I-Principles", EPA-600/9-76-005 Environmental Monitoring and Support Laboratory, Research Triangle Park, North Carolina 27711.

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9.5 Winefordner, J. D. and Long, G. L., Anal. Chem. 55, 712 A (1983).

CAUTION Laboratory Operations Involving Carcinogens

Most halogenated hydrocarbons are identified as human carcinogens; therefore, appropriate precautions should be observed when handling these compounds. Do not release halogenated hydrocarbon vapors to the laboratory atmosphere at any time. When venting or purging, the vapor must be routed to outside air. The OSHA regulations pertaining to the use and handling of halogenated hydrocarbons are published in Title 29 of the Code of Federal Regulations available in the Federal Register, Volume 40, May 28, 1975, pp. 23073.

TABLE 8.1.1
LIMITS OF DETECTION

Compound	Limit of Detection ppb	Concentration ppb	Mean Area	Area St. Dev.	n	% Rel St. Dev.
Methylene Chloride	1	1.37	8,230	800	6	9.7
Chloroform	0.004	0.006	8,290	197	5	2.4
Methyl Chloroform	0.004	0.004	34,000	3600	5	10.6
Carbon Tetrachloride	0.02	0.028	13,900	676	5	4.9
		0.01	2,400	320	6	13.3
Trichloroethylene	0.005	0.0064	15,600	515	5	3.3
Ethylene Dibromide	0.01	0.009	3,150	430	5	13.7
Perchloroethylene	0.004	0.0047	102,700	6080	5	5.9
Ethylene Dichloride	0.2	0.3	61,778	4811	6	7.8
		0.09	26,677	2143	5	8

METHOD NO. ADDL002

STANDARD OPERATING PROCEDURE FOR THE DETERMINATION OF VOLATILE ORGANICS IN AMBIENT AIR USING TENAX TRAP PRECONCENTRATION GAS CHROMATOGRAPHY AND TANDEM PHOTOIONIZATION/ELECTRON CAPTURE DETECTORS

1.0 SCOPE

This document describes a procedure for the determination of volatile halogenated hydrocarbons and aromatics having a boiling point of less than 120°C. This procedure is based on documents received from the ARB Haagen-Smit Laboratory, El Monte, as well as EPA Method T01.

2.0 SUMMARY OF PROCEDURE

Ambient air is continuously sampled and collected in a Tedlar bag over a 24 hour period and immediately sent to the laboratory for analysis. A sample from the bag is drawn through a sampling valve attached to a Tekmar LSC-2 Tenax Sample Concentrator (see Figure I) with a vacuum pump at 50 cc/min for four minutes (total sample volume: 200 cc). The organic constituents are trapped on Tenax and when the collection is complete, the Tenax is purged with 40 cc of helium to remove any trapped moisture. The sample is then thermally desorbed onto the head of the GC column. The GC column is temperature programmed and component peaks eluting from the column are sequentially detected and quantified, first by a photoionization detector (PID) and then by an electron capture detector (ECD). The components are identified based on retention times. Positive identification or confirmation requires the use of an appropriately configured GC/MS.

3.0 INTERFERENCES/LIMITATIONS

a. Components having similar GC retention times will interfere, causing misidentification and/or faulty quantitation.

b. Because of the very low sample concentrations, extreme care must be taken to insure that the sample is not degraded or contaminated by the Tedlar sampling bag, sampling apparatus, or delayed delivery to the laboratory. Exposure of the Tedlar sampling bag to temperatures greater than 25°C should be minimized.

c. Only components of the sample which can be detected by PID/ECD detectors will be quantified.

4.0 APPARATUS

a. Varian Model 6000 Gas Chromatograph/PID/ECD system equipped with a Varian Vista 402 dual channel data system.

b. Tekmar LSC-2 Sample Concentrator equipped with Tenax trap and sampling valves as shown in Figure 1.

c. Matheson Model 8240 Mass Flow Controller accurately calibrated in the 5-100 cc/min range.

d. Laboratory timer, accurate to within 0.1 minutes.

e. Gas tight microliter syringe, 50 ul.

f. GC column - 10' x 2 mm i.d. glass column packed with 1 percent SP-1000 on Carbopack B, 60/80 mesh.

5.0 REAGENTS

a. Primary Gas Standard (Scott Specialty Gases - Research Triangle Institute Certified Series 1)

Compound	Concentration (ppb)
Chloroform	107
Carbon tetrachloride	105
Perchloroethene	106
Vinyl chloride	104
Benzene	107

b. Primary Gas Standard (Scott Specialty Gases - Research Triangle Institute Certified Series 2)

Compound	Concentration (ppb)
1,2-Dichloroethane	101
1,1,1-Trichloroethane	98
Trichloroethene	100
1,2-Dibromoethane	102

c. Stock Gas Standard - Scott-Marrin Blend (assayed against primary cylinders)

Compound	Concentration (ppb)
Dichloromethane	4272
Chloroform	528
1,2-Dichloroethane	2104
1,1,1-Trichloroethane	424
Carbon tetrachloride	46
Trichloroethene	336
1,2-Dibromoethane	5
Perchloroethene	43
Vinyl chloride	4736
Benzene	1888

d. Control Gas Standard - Scott-Marrin Blend (assayed against primary cylinder)

Compound	Concentration (ppb)
Dichloromethane	6
Chloroform	0.2
1,2-Dichloroethane	0.2
1,1,1-Trichloroethane	3.6
Carbon tetrachloride	0.3
Trichloroethene	1.3
1,2-Dibromoethane	2.5
Perchloroethene	1.2
Vinyl chloride	3.3
Benzene	4.8

e. Surrogate Gas Standard (Scott-Marrin Blend)

Compound	Concentration (ppm)
Bromochloromethane	10
1,3-Bromochloropropane	33

6.0 PROCEDURES

a. Sample Trapping

1. The preconcentration system is shown in Figure 1.

2. The high concentration inlet is used for high concentration calibration standards and for other samples with concentrations higher than ambient levels. The sample is introduced through the high concentration inlet and 6 port valve into an appropriate size loop of known volume. The sample then passes through a 10 port valve, mass flow meter, and vacuum pump. Before an analysis, the system is leak checked by blocking the sample inlet port and observing that the mass flow meter reading drops to zero. The high concentration inlet then is connected to a Tedlar sample bag valve and the gas bag valve is opened. The loop is then flushed with sample gas for three minutes. After three minutes of flushing, the 6 port valve is reset so that the sample contained in the loop is carried into the trap by the helium purge gas. This continues for three minutes to ensure that all of the contents of the loop are trapped.

3. Ambient samples are introduced from Tedlar bags as described above, except that the sample loop is bypassed and the sample goes directly to the 10 port valve. After flushing the system with sample for three minutes, the 10 port valve is reset so that 200 cc's of sample is trapped (50 cc/min. for four minutes). After sample trapping is complete, the Tenax trap is flushed with 40 cc of helium to remove water vapor and any nonadsorbed reactive gases.

4. In both ambient and high concentration cases, after the sample has been trapped, the Tekmar LSC-2 heats the Tenax trap to 180°C while the trap is swept with the G.C.'s internal carrier gas for four minutes. The contents of the trap are thus desorbed and collected on the head of the G.C. column. The trap is baked out after the end of the desorption cycle. In the bakeout cycle, the trap is flushed with helium purge gas for eight minutes while being held at 225°C in order to prepare the trap for the next cycle. After bakeout the trap is isolated from the system and ready for the next sample.

b. Analysis

1. The concentrated sample is separated under the chromatographic condition detailed below. The resulting chromatogram (see Figure II) is then integrated and quantified by reference to calibration standard gases.

2. Instrument Conditions:

GC:	Column:	10' x 2 mm i.d. glass column, packed with 1 percent SP-1000 on Carbopack B 60/80 mesh	
	Temperatures:	Injection:	200°C
		Detector:	350°C
		Oven:	45°C, hold for four minutes, 5°C/min ramp, to 210°C, hold for eight minutes
	Flow Rates:	Carrier:	He, 20 cc/min
		ECD make up:	N_2, 40 cc/min
	Detectors:	ECD:	Range X 10, Attenuation X 32
		PID:	Range X 1, Attenuation X 32, 10.2 ev lamp
Conc:	Tekmar LSC-2:	Purge:	4 minutes
		Desorb:	4 minutes at 180°C
		Bake:	8 minutes at 225°C

3. All blanks, standards, control samples, and ambient samples are spiked with surrogate compounds by injecting 50 microliters of the surrogate gas standard (5.c.) during sample trapping. The surrogate compounds, chosen such that they simulate the characteristics of the analytes of interest and are unlikely to occur in the environment, are added to insure that systematic errors or equipment failures will be noted and corrected promptly.

4. The first step in a calibration is to analyze a system blank. This is done by trapping and analyzing a 200 cc sample of auxiliary carrier gas. The system blank must be free of interfering peaks. A system blank must also be run after a high concentration sample is analyzed in order to detect any carry-over within the system.

5. A calibration is performed using a 1.25 cc loop of stock standard gas (5.c.). Two hundred cubic centimeters of helium gas is passed through the loop to carry the standard onto the trap. The calibration analysis is made as a normal analysis. The calculated concentration value for each component should be inspected to insure consistency with previous analyses. The stored chromatographic information may then be used to recalculate the response factors for the subsequent analyses. The G.C. data system will not accept updated response factors which are in excess of plus or minus 15 percent of historic data.

6. Following calibration, 200 cc of the control sample (S.d.) is concentrated on the trap and analyzed. The control sample data are plotted on control charts of the normal Shewhart type. Upper and lower warning limits are plus or minus two times the standard deviation. Any analysis which falls outside the upper and lower warning limits is repeated and the laboratory quality control officer is advised. Upper and lower control limits are plus or minus three times the standard deviation. If any analysis falls outside the upper or lower control limit, the method is discontinued until the out of control situation is remedied. The laboratory quality control officer is advised and provided with written documentation of the out of control condition and how it was remedied. All data generated prior to the out of control situation must be reviewed for possible decertification by laboratory management.

7. Multipoint calibrations are conducted monthly. Each multipoint calibration includes a trap blank and three standard concentration levels to bracket the concentration ranges expected in ambient air. If subsequent data indicate that the resulting least squares analyses are consistently acceptable, less frequent multipoint calibrations may be made.

7.0 PERFORMANCE

a. All ambient field samples are analyzed in duplicate. The relative error between analyses must be less than 20 percent. Duplicate analyses having greater than 20 percent relative error must be decertified.

b. The percent recovery of the surrogate is recorded in the instrument laboratory workbook for each analysis. If this value is outside the 80% to 120% range, the sample analysis must be repeated.

8.0 METHOD SENSITIVITY, PRECISION AND ACCURACY

The method sensitivity, precision and accuracy are outlined in Table I. These data were produced with gaseous calibration standards, and using carrier gas as the sample matrix. The relative accuracy of the method, with the exception of dichloromethane, is based on reference to the Research Triangle Institute Certified Gas Standards (NBS traceable). Authoritative reference calibration standards for dichloromethane are under development at NBS but are not yet available. The concentration value of the present standard was assigned by the commercial manufacturer and found to be in good agreement with diluted pure dichloromethane prepared in our laboratory. The absolute accuracy of the method has not been determined by interlaboratory testing.

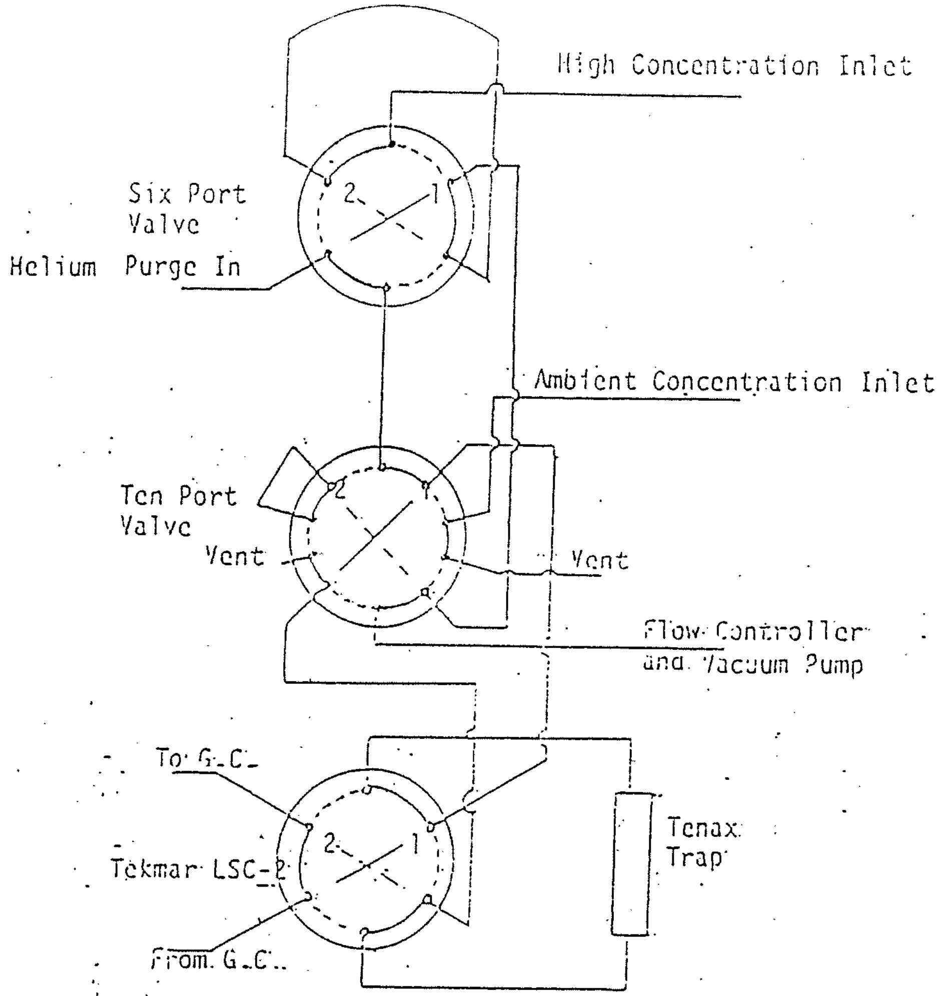


Figure 1. Schematic of concentrator system. Sampling Conditions are: 290 cc volume, purge at 40cc/min, 1 min., desorb at 180 C for 4 min., bake for 8 min. at 225 C.

SYSTEM GUIDE

Operational Step	Valve Position 6-Port	10-Port	LSC-2	Purge Gas
Loop Fill	1	1	1	Off
Loop Trap	2	1	1	On
Ambient Trap	1	2	1	Off
Trap Desorb	1	1	2	Off
Trap Bake Out	1	1	1	On

Table I

Method Sensitivity and Precision

Compound	Correlation Coefficient	Slope	R.S.D* (Percent)	Detector	LOD ppbv
Vinyl Chloride	0.997	0.946	16	PID	0.8
Dichloromethane	0.999	0.975	5	ECD	0.6
1,1-Dichloroethylene	0.991	0.966	6	ECD	0.05
Chloroform	0.999	0.901	3	ECD	0.02
1,2-Dichloroethane	0.999	1.054	7	ECD	0.1
1,1,1-Trichloroethane	0.999	0.989	9	ECD	0.01
Carbon Tetrachloride	0.999	0.980	6	ECD	0.005
Trichloroethylene	0.999	0.992	5	ECD	0.02
Benzene	0.998	0.950	10	PID	0.5
1,2-Dibromoethane	0.974	1.067	9	ECD	0.005
Tetrachloroethylene	0.994	1.060	10	ECD	0.01

* R.S.D. - Relative Standard Deviation at 5 x LOD, n = 5

PRELIMINARY DRAFT

DATE________ SIGNATURE________

STATE OF CALIFORNIA
AIR RESOURCES BOARD
AEROMETRIC DATA DIVISION LABORATORY

Method For Determination Of Benzene, Xylenes, Toluene And Ethyl Benzene In Ambient Air Using Tenax Preconcentration And Gas Chromtography/Photoionization Detection

Introduction

This document describes a packed column GC/PID method to separate and quantitate the o-, m-, and p-xylene isomers plus benzene, toluene and ethyl benzene in ambient air samples. This method consists of preconcentrating ambient air samples using a Tenax trap and then thermally desorbing the components onto a packed glass column for analysis by PID. Air-actuated valves and data processing using a data system make this a highly automated system.

Apparatus

1. Varian Model 6000 Gas Chromatograph/HNu photoionization detector (GC/PID) system equipped with a Vista 402 Data System.
2. A sampling and analysis valve system consisting of a 6-port and 4-port valve, 1/8" x 6" Ni trap filled with 60/80 mesh Tenax and an injection system for standards as shown in Figure 1.
3. Matheson Model 8240 Mass Flow Controller accurately calibrated in the 5-100 cc/minute range and a Metal Bellows Pump for sampling.
4. Gas-tight microliter syringes with on/off valves for injection of standard gas mixtures.

Reagents and Standards

1. SRM-1806 benzene 10 ppm in nitrogen standard.
2. Chemical standards of highest purity available.
3. Methanol ACS grade.
4. Stock solutions for standards.

Stock solutions are prepared by dilution of pure chemicals into methanol. The following volumes are diluted to 50 ml using a volumetric flask.

Compound	Stock Standard ul/50 ml	Gas Standard-ppmv (10 ul/250 cc)	Trap Standard-ppbv (50 ul/200 cc)
Benzene	182	40	10
Toluene	217	40	10
Ethyl benzene	250	40	10
o-xylene	246	40	10
m-xylene	251	40	10
p-xylene	252	40	10

A 10 ul aliquot of the stock solution is injected into a 250 ml glass dilution bulb filled with zero air. The bulb is heated in an oven at 40°C for 1 hour. After equilibration, a gas-tight syringe is used to inject 1.8 ppb to 7.2 ppb samples in order to construct a calibration curve. The following data in Table I was obtained:

Table I

Compound	Slope	Correlation Coefficient	R.S.D. at 5.4 ppb (Percent)	M.D.L. (ppb)
Benzene	255	0.9998	1.3	0.5
Toluene	229	0.9996	5.6	1
Ethyl benzene	132	0.9995	2.7	0.5
p-xylene	169	0.9987	1.3	1
m-xylene	185	0.9982	3.5	1
o-xylene	161	0.9563	1.4	1

M.D.L. = Minimum Detectable Limit = Intercept + (3 x R.S.D. x Intercept)

Instrument Conditions

Column	:	10 ft x 2 mm i.d. glass 5% SP1200/1.75% bentone on 100/120 Supelcoport
Injector Temperature	:	200°C
Detector Temperature	:	160°C
Detector Range	:	X1
Detector Attenuation	:	X32
PID Lamp	:	10.2 eV
Valve Temperature	:	180°C
Flow Rate	:	30 ml/minute helium
Oven Temperature Program	:	10°C for 1 minute 10°C to 45°C at 8°/minute 45°C to 100°C at 3°/minute

Procedure

Apparatus shown in Figure 1.

1. With the 6-port valve in the "Fill Position" and the 4-port valve closed, the Teflon sampling line is attached to the Tedlar sample bag. The sample line is then flushed for 5 minutes at a flow rate of 20 cc/minute. The isolated Tenax trap is cooled to 30°C during this initial flushing. (Relays 2, 3, 7, 8 off.)

2. When flushing is completed, the 4-port valve is switched to the "Fill Position" and sample is pumped through the trap for 10 minutes at 20 cc/minute. At the beginning of the trapping the internal standard and calibration gas standard are injected through the in-line injector into the gas stream. (Relay 3 on.)

3. At the end of 10 minutes the Tenax trap is isolated (4-port valve closed) and the trap heated to 210°C. The sample inlet is disconnected from the Tedlar sample bag and connected to the auxiliary carrier gas supply to sweep out any residual sample in the lines. (Relay 3 off, then Relay 8 on.)

4. The 6-port valve is switched to the "Sweep Position" allowing the carrier gas to be directed through the 4-port trap valve which is still in the isolated position. (Relay 2 on.)

5. With the GC oven and data system ready the 4-port valve is switched to the "Fill Position" and the data system and the column temperature program are started. (Relays 3, 7 on.)

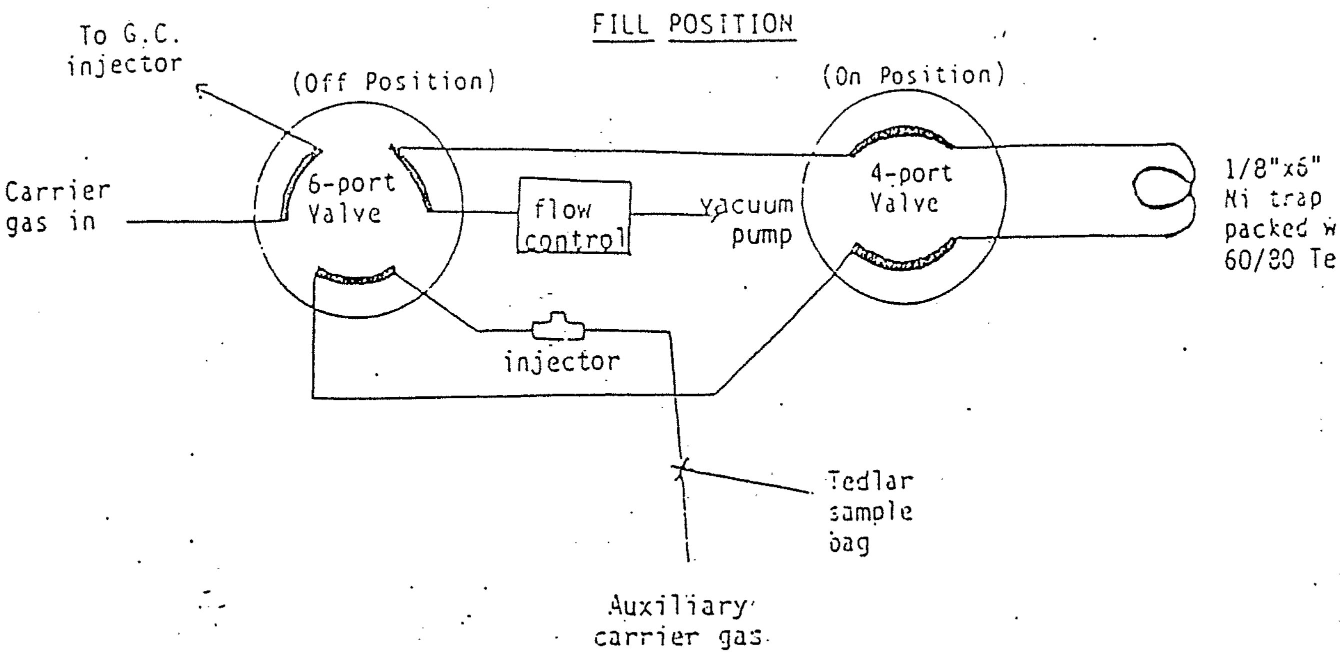
6. The resulting chromatogram is analyzed and the results quantitated and tabulated. (See Figure 2.)

Automation of this system has been accomplished by use of relay switches/automatically actuated valves and a data system. The following chart details the automation:

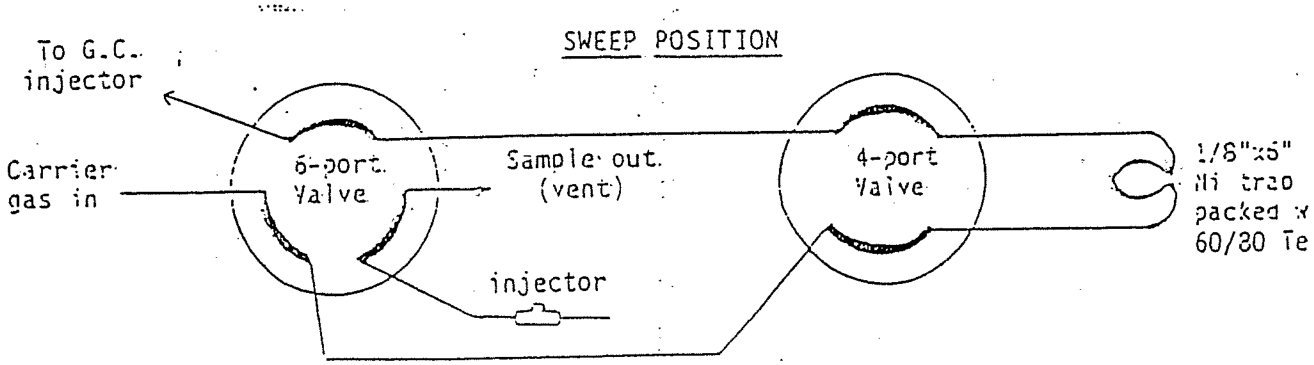
Time (Minutes)	Relay On	Relay Off
0.00		2, 3, 7, 8
0.01	3	
10.01		3
10.10	8	
12.00	2	
13.00	3, 7	
23.00		2, 3
24.00		8

Relay 2 = 6-port valve
Relay 3 = 4-port valve
Relay 7 = data system
Relay 8 = Tenax trap heater

TRAP SYSTEM



FILL POSITION
To G.C. injector
(Off Position)
(On Position)
Carrier gas in
6-port Valve
flow control
Vacuum pump
4-port Valve
1/8"x6" Ni trap packed w 60/80 Te
injector
Tedlar sample bag
Auxiliary carrier gas

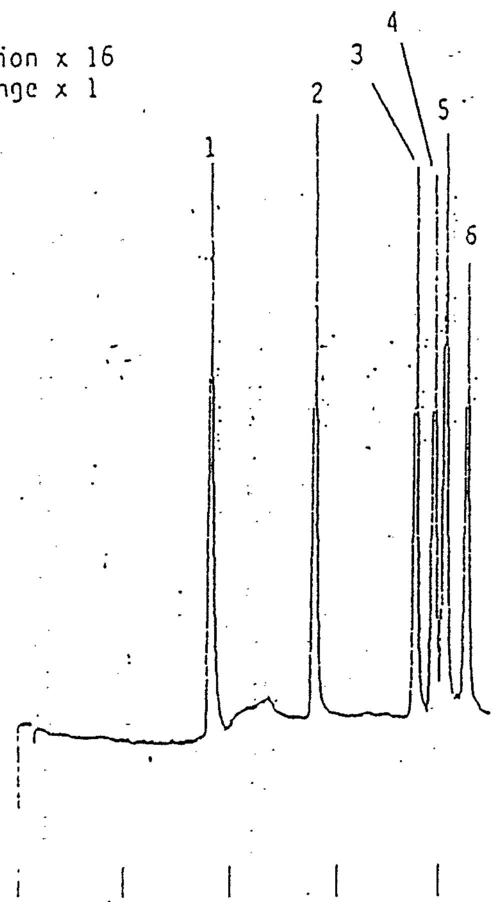


SWEEP POSITION
To G.C. injector
Carrier gas in
6-port Valve
Sample out. (vent)
4-port Valve
1/8"x6" Ni trap packed w 60/80 Te
injector

Figure 2

Standard Aromatic Mixture
10ppb/component

Attenuation x 16
Range x 1



Compound 10 ppb each	Retention Time minutes
1. Benzene	9.114
2. Toluene	13.367
3. Ethyl benzene	18.834
4. p-xylene	19.766
5. m-xylene	20.350
6. o-xylene	21.404

APPENDIX D

ERT LABORATORY ANALYTICAL METHODS

South Coast
AIR QUALITY MANAGEMENT DISTRICT
9150 FLAIR DRIVE, EL MONTE, CA 91731 (818) 572-6200

May 19, 1987

Mr. Michael L. Porter
Laboratory Manager
ERT, A Resource Engineering Company
975 Business Center Circle
Newbury Park, CA 91320

Dear Mr. Porter:

This is in response to you letter of May 13, 1987, in regard to ERT's alternate procedures for analyzing selected halogenated hydrocarbons, benzene, and vinyl chloride in landfill gases and in ambient air.

This District will accept, as equivalent to CARB Methods 102-Revision 1, 103-Revision 1, ADDL002 or ADDL004, the methods for the specified compounds referenced in the Technical Services Division research report "Hazardous Pollutants in Class II Landfills", written by John A. Wood and Michael L. Porter while they were employees of this District.

Very truly yours,

Sanford M. Weiss
Director of Technical Services

Margil W. Wadley

Margil W. Wadley, Ph.D.
Manager of Laboratory Services
(818) 572-6452

MWW:md

cc: E. Camarena
W. Dennison

SUMMARY OF THE ERT
WESTERN REGIONAL LABORATORY METHODS

Method No. 101

June 1, 1987

Laboratory Analytical Procedure For the Measurement of C_1 and C_2 Halogenated Hydrocarbon Concentrations in Ambient Air and Landfill Gas Using Gas Chromatography

I. Introduction

A chromatographic analysis procedure may be used to determine volumetric concentrations of volatile C_1-C_2 halogenated hydrocarbons in whole air samples. The samples are received in the laboratory for analysis. The air samples may be collected in Tedlar sampling bag containers over a designated time period or they may be instantaneously collected in steel, glass or Tedlar bag containers. Actual sampling procedures are described elsewhere. It is important that samples be received in the laboratory for analysis immediately after collection.

The approach for analyzing C_1-C_2 halogenated hydrocarbons is to choose isothermal column temperatures and valve time switching such that a group of selected components of are analyzed.

a) The following components are analyzed at a temperature of 67°C with valve back-flush at 0.50 minutes.

1,1-dichloroethane

Dichloromethane
Trichloromethane
1,1,1-trichloroethane
Tetrachloromethane
1,2-dichloroethane
Trichloroethene
Cis-1,2-dichloroethene
trans-1,2-dichloroethene

b) The following components are analyzed at a column oven temperature of 150°C and a valve back-flush at 0.30 minutes:

Tetrachloroethene
1,2-dibromoethane

c) The following component is analyzed at an oven temperature of 25°C and a value back-flush at 0.35 minutes:

Freon 113

II. Summary

Whole air is withdrawn from a sample container using a ground glass gas syringe, 30 to 50 ml, and transferred to a sample loop injection valve on a gas chromatograph. (Chromatographic separations are made using fused silica capillary columns.) A 10-port switching valve allows timed sample cutting and back-flush. Chromatographic separations are made isothermally. A combination of column oven temperature and valve switch timing allows specific halogenated components to be analyzed in a repeatable manner. C_1-C_2 halogenated hydrocarbons eluting from the chromatographic column are detected and quantified by an electron capture detector. Components

are identified based on retention times. Positive identification or confirmation requires the use of an appropriately configured gas chromatograph/mass spectrometer.

III. Interferences/Limitations

Components that co-elute with the species of interest will cause misidentification and/or inaccurate quantification. The use of a selective dector like the electron capture detector minimizes co-elution interference as does the high resolution fused silica capillary column chosen for analytical separation.

Sample integrity is very important to accurate analyses of low concentration components expected in the ambient air. Care must be taken in sample collection and containment to avoid contamination and degradation.

SUMMARY OF THE ERT

WESTERN REGIONAL LABORATORY METHODS

Method No. 102

June 1, 1987

Laboratory Analytical Procedure For the Measurement Vinyl Chloride Concentrations in Landfill Gas Using Gas Chromatography

I. Introduction

Landfill gas samples can be withdrawn from a gas collection system, bore hole, well or surface crack at the site using an evacuated steel or glass container or a pump to fill a Tedlar sample bag. The sample is analyzed in the laboratory using gas chromatograpy with a photoionization detector. Certified gas standards of approximately 1 ppm vinyl chloride are used as working standards for quantifying samples using the external standard method of calculation.

II. Summary

Gas samples are transferred from the sample container to the gas chromatograph sample valve inlet using a ground glass syringe of appropriate size (30 to 100 ml). Two valves, a 6-port and 10-port are plumbed so that sample loop injection, pre-column, analytical column and pressure switch flow control are accomplished to give the proper separation of vinyl chloride and from the other components in landfill gas. A pre-column of n-octane porasil C (3'x 1/8" nickel) is timed to allow vinyl chloride to pass through it and on to the analytical column. The pre-column is then switched to black-flush and the analytical column (6' x 1/8" stainless steel), chromosil 310, 800/100 mesh separates vinyl chloride.

III. Interference/Limitations

Components that co-elect with vinyl chloride will cause misidentification and/or inaccurate quantification. The photoionization detector will give response to many components but the choice of column materials will limit the components reaching the detector. No interference has been found under the conditions of analysis.

SUMMARY OF THE ERT
WESTERN REGIONAL LABORATORY METHODS

Method No. 103

June 1, 1987

Laboratory Analytical Procedure For the Measurement of Methane, Carbon Monoxide and Carbon Dioxide Concentrations in Landfill Gas Using Gas Chromatography

I. Introduction

Landfill gas samples can be withdrawn from a gas collection system, bore hole, well or surface crack at the site using an evacuated steel or glass container or a pump to fill a Tedlar sample bag. The sample is analyzed in the laboratory using gas chromatograpy with a thermal conductivity detector. Certified gas standards of approximately 5% methane, carbon monoxide and 14% carbon dioxide are used as working standards for quantifying samples using the external standard method of calculation. Working standards are calibrated with NBS, SRM's where possible.

II. Summary

Gas samples are transferred from the sample container to the gas chromatograph sample valve inlet using a ground glass syringe of appropriate size (30 to 100 ml). Two valves, a 6-port and 10-port are plumbed so that sample loop injection, pre-column, analytical column and pressure switch flow control produce the proper separations of methane, carbon monoxide and carbon dioxide from the other components in landfill gas. A pre-column of Porapack Super Q (3'x 1/8" nickel) is timed to allow nitrogen, oxygen, methane, carbon monoxide and carbon dioxide to pass through and on to the analytical column. The pre-column is then switched to black-flush and the analytical column (3' x 1/8" stainless steel), Carbosphere, 80/100 mesh separates methane, carbon monoxide and carbon dioxide.

III. Interference/Limitations

Components that co-elect with methane, carbon monoxide and carbon dioxide will cause misidentification and/or inaccurate quantification. The thermal conductivity detector will give response to most any gas other than the carrier, helium, but the choice of column materials (Super Q and Carbosphere) will limit the components reaching the detector. No interference has been found under the conditions of analysis.

SUMMARY OF THE ERT
WESTERN REGIONAL LABORATORY METHODS

Method No. 104

June 1, 1987

Laboratory Analytical Procedure For the Measurement of Nitrogen and Oxygen Concentrations in Landfill Gas Using Gas Chromatography

I. Introduction

Landfill gas samples can be withdrawn from a gas collection system, bore hole, well or surface crack at the site using an evacuated steel or glass container or a pump to fill a Tedlar sample bag. The sample is analyzed in the laboratory using gas chromatograpy with a thermal conductivity detector. Ambient atmosphere is used as a working standard for quantifying samples using the external standard method of calculation.

II. Summary

Gas samples are transferred from the sample container to the gas chromatograph sample valve inlet using a ground glass syringe of appropriate size (30 to 100 ml). Two valves, a 6-port and 10-port are plumbed so that sample loop injection, pre-column, analytical column and pressure switch flow control produce the proper separation of nitrogen from oxygen and from the other components in landfill gas. A pre-column of Porapack Super Q (3'x 1/8" nickel) is timed to allow nitrogen, and oxygen to pass through it and on to the analytical column. The pre-column is then switched to black-flush and the analytical column (5' x 1/8" stainless steel), Molecular Seive 5A, 80/100 mesh separates nitrogen and oxygen.

III. Interference/Limitations

Components that co-elect with nitrogen and oxygen will cause misidentification and/or inaccurate quantification. The thermal conductivity detector will give response to most any gas other than the carrier, helium, but the choice of column material (Super Q and Carbosphere) will limit the components reaching the detector. Argon will co-elute with oxygen under the conditions of analysis.

SUMMARY OF THE ERT
WESTERN REGIONAL LABORATORY METHODS

Method No. 105

METHANE AND TOTAL NON-METHANE HYDROCARBONS

I. Introduction

Total Combustion Analysis (TCA) is an analytical instrumentation system developed in the SCAQMD laboratory for analysis of CO, CH_4, CO_2 and non-methane hydrocarbons in samples taken from various combustion based pollution control emission systems. When combined with a flame ionization detector (FID), the TCA system, now designated TCA/FID, becomes an effective instrument for analysis of low level CH_4 and non-methane hydrocarbons as might be expected in 3-way catalyst treated auto exhaust. The TCA/FID system is described in the Federal Register under Method No. 25 and is the EPA's Method of choice for determining "the percentage reduction of VOC (volatile organic carbon) emissions achieved by add-on emission control devices" for autos and light duty trucks. A description of the TCA/FID method as applied to auto exhaust emission analysis is described in this procedure.

II. Summary

The Total Combustion Analysis (TCA/FID) instrumental system offers the sensitivity and range necessary for analyzing auto exhaust emission samples for methane and non-methane hydrocarbons. Methane, carbon monoxide, carbon dioxide and total non-methane hydrocarbons are separated chromatographically and converted to methane for detection by flame ionization. Typical ambient atmospheric levels of methane and non-methane hydrocarbons in the range of 2 to 8 ppm are easily determined in background samples by this method. Column temperatures are controlled using ice water and boiling water immersion baths. Separations of CO, CH_4 and CO_2 are made while the carrier flow is in the forward direction and the column is immersed in ice water. Non-methane hydrocarbons are obtained by immersing the column into boiling water. An example chromatogram with peak identification is shown in Figure A.

III. Theory of Operation

The total combustion analysis (TCA) system is designed to separate and detect four species of carbon: CO, CH_4, CO_2 and total non-methane hydrocarbons in gaseous samples. A two ml gaseous sample aliquot injected into the TCA instrument is chromatographically separated into the four carbon species. Each in turn is combusted to CO_2 and then reduced to methane using hopcolite and nickel catalysts, respectively. A flame ionization detector (FID) having a sensitivity <1 ppm methane and liner range $\geq 10^{+6}$ ppm methane is used to detect the methane derived from the four carbon species. The benefit of converting all carbon to methane for quantification is that standardization can be performed using only methane. FID response factors are not needed for what was initially a hydrocarbon mixture, and carbon monoxide and carbon dioxide become detectable as methane by FID.

IV. Description of Instrumentation

The TCA/FID system is built around a Hewlett Packard 5700 series Gas Chromatograph (GC with a FID (flame ionization detector). The GC oven is used to house two

6-port valves and connecting tubing. The oven temperature is maintained at 140 °C. The 6-port valves allow the oxidation catalyst (Hopocolite) and the reduction catalyst (nickel) to be switched in and out of the carrier flow independently so their conversion efficiencies can be determined. A diagram of the TCA/FID system is shown in Figure B. The GC mainframe houses the detector, electrometer and temperature controls. An injection system and chromatographic column designed and constructed in this laboratory are mounted on the outside of the GC mainframe. Sample injection and direction of analytical column carrier flow are controlled using a 10 port valve (Carle micro volume). The valve and sample loop are maintained at 150 °C by a Carle valve oven. Switching is done with a Carle actuator motor and valve minder. Figure C shows plumbing of the 10 port valve. The exterior mounted 6' L. x 1/8" O.D. stainless steel combination column is packed first with 1 1/2' of 10% SF96 followed by 4 1/2' of 80/100 mesh Porapak Q.

TABLE A

INSTRUMENT OPERATING PARAMETERS

Analytical Column:	Exterior mounted, 6' L. x 1/8" O.D. stainless steel packed in two sections. 1) The first section is 1 1/2' of 800/100 mesh Cromosorb W coated with 10% SF-96. 2) The second section is 4 1/2' of 80/100 mesh Parapak Q.
Temperatures: Analytical Column:	Controlled by immersion of the column in ice water and boiling water baths according to the proper timing sequence.
Detector:	250 °C
Oxidation Catalyst:	650 °C
Reduction Catalyst:	350 °C
10 port valve oven:	150 °C
GC oven:	140 °C
Heated transfer lines:	105 °C
Carrier:	Helium, 25 ml/min
Air:	180 ml/min
Hydrogen:	24 ml/min
Oxidation Catalyst:	A 12" L. x 1/4" O.D. inconel tube is packed with 6" of granular Hopcolite obtained from Mine Safety and Appliance Co. The tube ends are plugged with Quartz wool.
Reduction Catalyst:	A 12" L. x 1/4" O.D. inconel tube is packed with 6" of

firebrick 40/60 mesh coated with nickel nitrate 10% by weight. Nickel nitrate is dissolved in DI water. Firebrick is stirred into the solution and heated on a hot plate to expel the water. Final heating to dryness is done in an oven at 200 °F. The ends of the inconel tube are plugged with Quartz wool.

Sample loop: 2 ml stainless steel heated at 150 °C.

TABLE B

TIMING SEQUENCE

Step No.	Time	Position	Description
1	0 min.	2	Immerse the analytical column in ice water.
2	3 min.	1	Injected 20 mls of sample, standard or blank N_2 through the 2 ml sample loop and then switch the 10 port valve to position 1.
3	13 min.	2	Remove the ice water bath from the analytical column. Switch the 10 port valve to position 2 and immediately immerse the analytical column in boiling water.
4	17 min.	2	Remove the boiling water bath and immerse the analytical column in ice water, beginning the sequence again at step 1 and time zero.

CALCULATIONS

Total non-methane hydrocarbons are quantified by integrating a response vs. time curve from a sample and comparing areas with a standard mixture of ethane (25 ppm) and isopentane (10 ppm).

$$H = \frac{C_{std} \times R_u - RB}{R_{std} - R_B}$$

H = total non-methane hydrocarbons as ppm methane
C_{std} = concentration of standard as ppm methane
R_u = response from sample (area)
R_{std} = response from standard (area)
R_B = response from blank (area)

Methane is determined by comparing peak heights of the sample with a standard of 100 ppm concentration.

$$\text{Methane (ppm)} = \frac{C_{std} \times R_u}{R_{std}}$$

C_{std} = concentration of the standard methane in ppm
R_u = response of the sample (peak height)
R_{std} = response of the standard (peak height)

Compound	Detectable Limits (PPMV) Lower	Upper
Methane	1	1000
Non-methane hydrocarbons	1	100
Carbon dioxide	2	5000
Carbon monoxide	1	1000

SUMMARY OF THE ERT

WESTERN REGIONAL LABORATORY METHODS

Method No. 107

June 1, 1987

Laboratory Analytical Procedure For the Measurement Benzene Concentrations in Landfill Gas Using Gas Chromatography

I. Introduction

Landfill gas samples can be withdrawn from a gas collection system, bore hole, well or surface crack at the site using an evacuated steel or glass container or a pump to fill a Tedlar sample bag. The sample is analyzed in the laboratory using gas chromatograpy with a photoionization detector. National Bureau of Standards, Standard Reference Material, benzene is used as a working standard for quantifying samples using the external standard method of calculation.

II. Summary

Gas samples are transferred from the sample container to the gas chromatograph sample valve inlet using a ground glass syringe of appropriate size (30 to 100 ml). Two valves, a 6-port and 10-port are plumbed so that sample loop injection, pre-column, analytical column and pressure switch flow control are accomplished to give the proper separation of benzene from other components in landfill gas. A pre-column of DB-1 (15' x 0.53 mm capillary) is timed to allow benzene to pass through it and on to the analytical column. The pre-column is then switched to black-flush and the analytical column (25 M x 0.53 mm capillary) DB-1, separates benzene.

III. Interference/Limitations

Components that co-elect with benzene will cause misidentification and/or inaccurate quantification. The photoionization detector will give response to many components but the high resolution achieved by the choice of a capillary column will limit interference. No interference has been found under the conditions of analysis.

APPENDIX E

LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Summary of the Analytical Laboratory

Quality Control Handbook

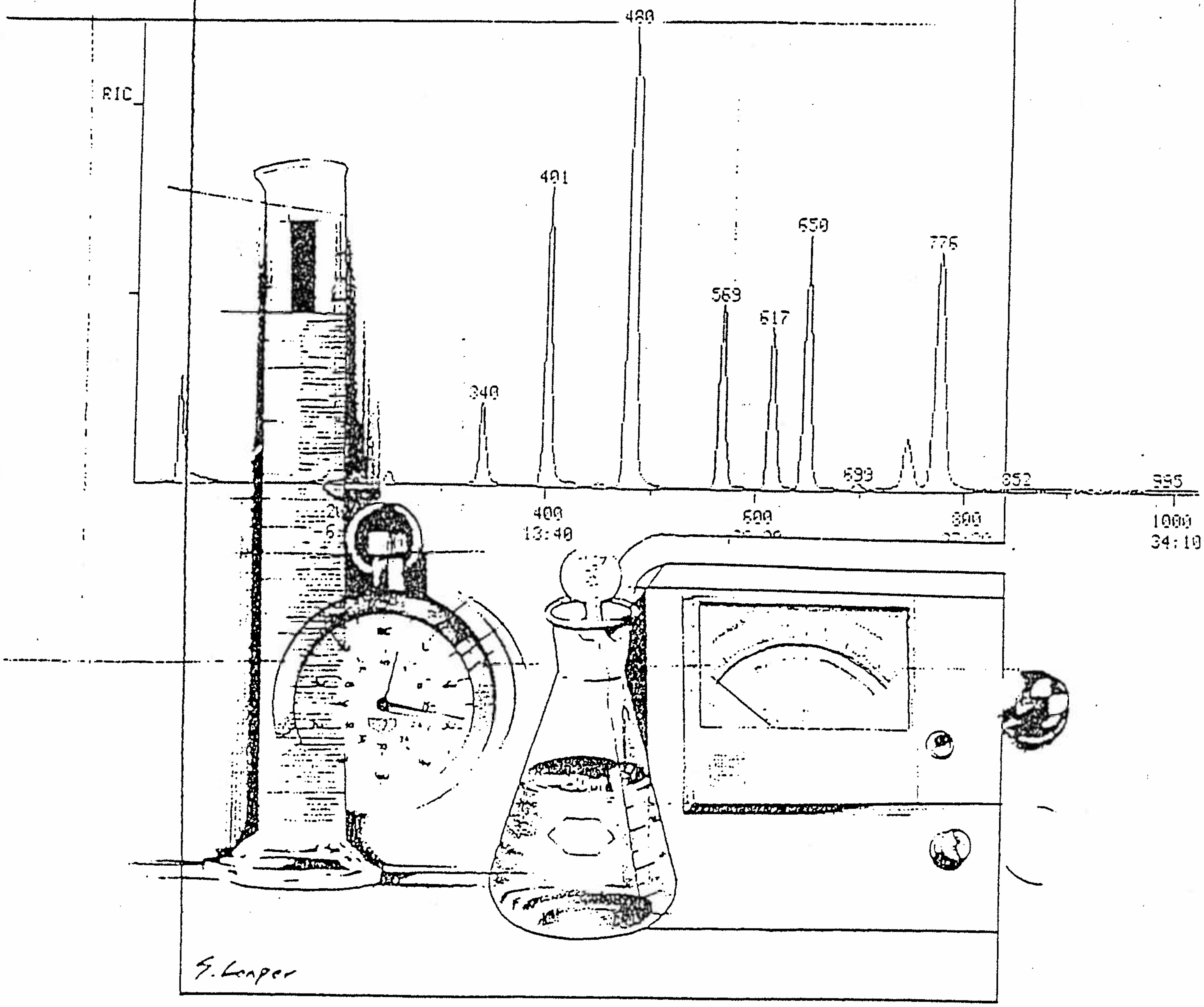


TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1. INTRODUCTION

1.1 Purpose of the Summary

ERT, A Resource Engineering Company, is dedicated to the concept that all technical work must be accomplished in accordance with accepted quality assurance practices. ERT assures its clients of thorough and cost-effective quality assurance programs designed to fill specific project needs. ERT is committed to the philosophy that quality operations result from quality planning, design, and work performance by skilled laboratory personnel. ERT's policy is to perform its varied types of technical work in accordance with standard quality assurance practices such as those prescribed by EPA Good Laboratory Practices and other pertinent documents.

This document is a technical summary of ERT's analytical laboratory's quality control program. Complete details of the comprehensive quality control program are contained in the Analytical Laboratory Quality Control Handbook. The Handbook contains specific instructions for every phase of the program and is kept current through periodic updates. All laboratory personnel are required to study and understand the contents of the Handbook, and to use it as the basis for all laboratory operations. The Table of Contents from the Handbook is reproduced for this summary.

This summary is designed to furnish sufficient technical information to evaluate ERT's laboratory quality control practices. For each section of the Handbook, this summary furnishes a brief description of the key issues and ERT's approach to each issue. ERT will make a copy of the Handbook available for proposal and pre-project evaluation audits and for post-project data audits.

1.2 Objectives of the Quality Control Program

The ERT National Laboratory Quality Control Department is completely independent of line function. Its manager reports directly and exclusively to the National Laboratory Services Division Director. The Laboratory Quality Control Coordinator is appointed by the National Laboratory Services Quality Control Manager and reports directly to the division QC Manager, with ancillary responsibilities to the Laboratory Manager and the Corporate Quality Assurance Manager.

Figures 1 and 2 shows the position for the Quality Control Coordinator relative to overall division operations. The laboratory quality control program has the following objectives:

- To provide an ongoing quality assessment program for all analytical work

- To perform regularly scheduled audits and thereby document an objective evaluation of quality-related practices.

- To promptly identify variances and implement corrective actions.

- To maintain readily identifiable and retrievable records to provide documentary evidence of the quality of activities performed.

- To provide procedures for implementing project-specific quality plans.

- To define responsibility and authority for developing and implementing quality plans.

- To provide quality reference documentation for each project.

Figure 3 shows the necessary inputs, controls, and functions necessary to achieve these objectives within the analytical laboratory.

R. BRADWAY
ACTING DIRECTOR
NATIONAL LABORATORY SERVICES

K. FUNG

COST ANALYST

R. BENTLEY
QUALITY CONTROL MANAGER

PROGRAM MANAGERS

J. MASTONE	R. BENTLEY	M. PORTER
A. PARADICE	T. TRAINOR	R. BENTLEY

LAB MANAGERS

J. MASTONE — EASTERN LABORATORY OPERATIONS

B. BLANKFIELD — GULF LABORATORY OPERATIONS

M. PORTER — WESTERN LABORATORY OPERATIONS

F. MYERSKI — PROCESS TECHNOLOGY LABORATORY OPERATIONS

Figure 1
NATIONAL LABORATORY SERVICES

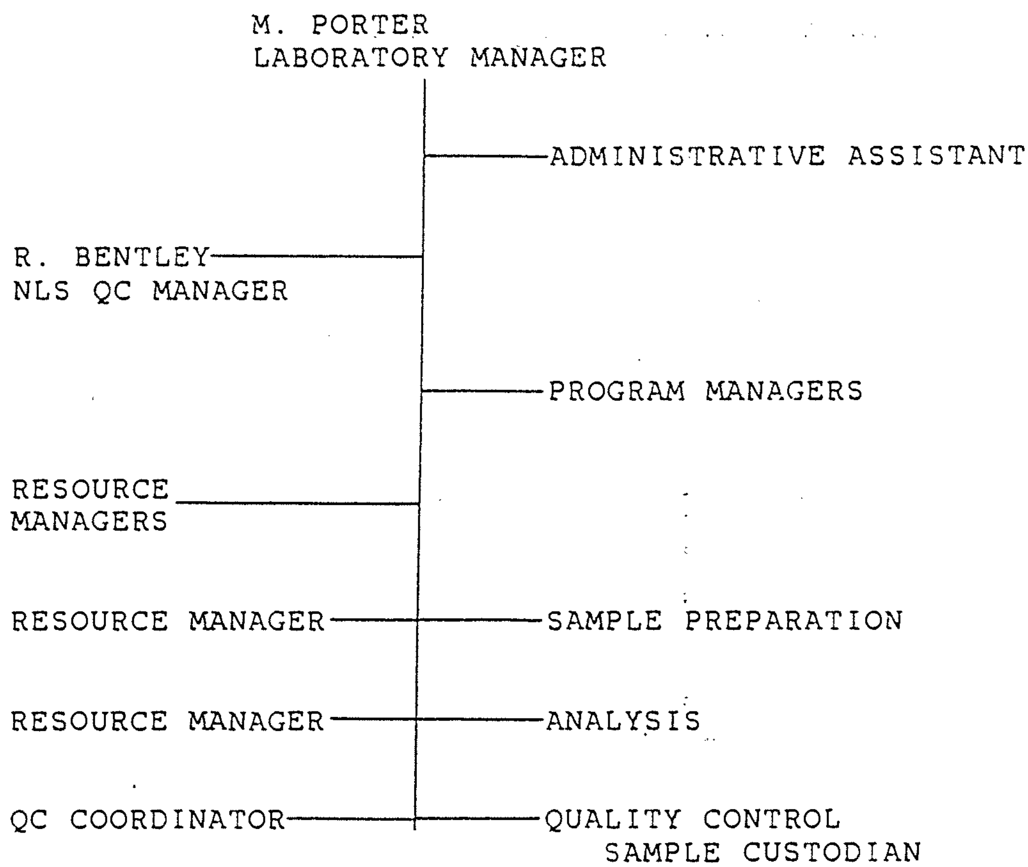


Figure 2

WESTERN LABORATORY SERVICES

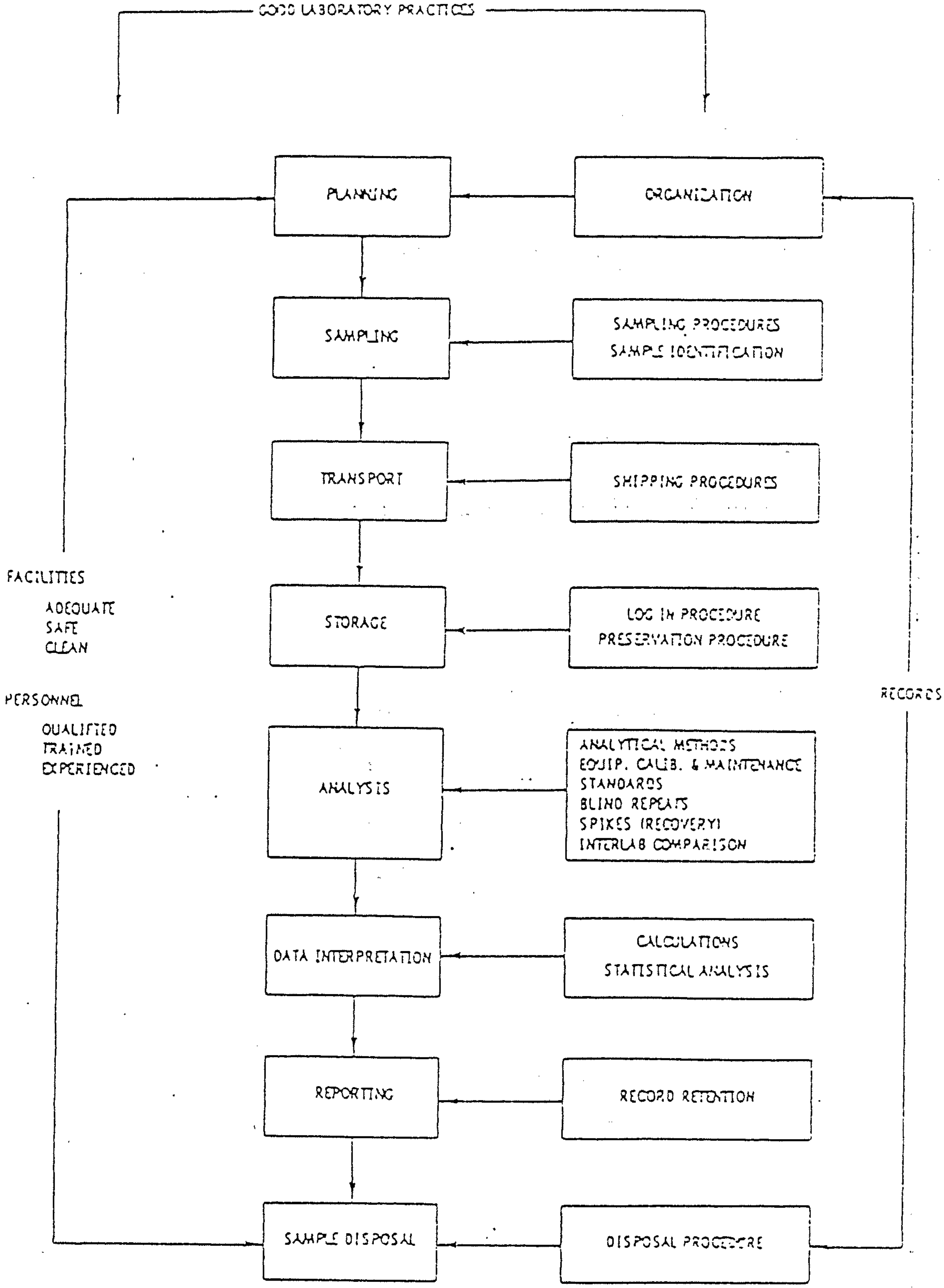


Figure 3 Schematic of Good Laboratory Practices

2. PERSONNEL

The operational structure of the environmental analytical laboratory is provided in Figure 2. Personnel are assigned to perform specific duties within the following functional groups:

- Sample preparation group
- Analysis group
- QC coordinator

2.1 Qualifications

Each functional group, excluding the QC coordinator, is composed of a group leader, environmental chemists, laboratory technicians, and/or laboratory assistants.

A description of the individual positions is provided in the Handbook and summarized below:

- Resource Manager (Group Leader):
  A professional (BS, MS, etc.); experienced environmental analyst (>4 years); specialized in highly complex procedures; capable of supervising other professionals and technicians.

- Environmental Chemist:
  Professional (BS, etc); experienced environmental analyst (1-4 years) capable of following complex analytical procedures; possess a good background in various analytical techniques; capable of supervising technicians.

- Laboratory Technician:
  Professional (A.S., B.S. etc.) with minimum training (0-1 year) or with specialized training (1-2 years); possess a knowledge of chemistry and/or a background in general laboratory techniques; an aptitude for following analytical procedures.

- Laboratory Assistants:
  Semi-skilled (H.S. diploma preferred) with a minimal chemistry background or training in laboratory techniques.

2.2 Training

Laboratory training endeavors fall into three (3) categories:

- initial training
- short-term training
- long-term (developmental) training

The training techniques utilized by the laboratory to provide each individual with increased analytical skills include:

- on-the-job training
- lectures
- programmed learning
- conferences and seminars (in-house and out-of-house)
- short courses (provided by ACS or other scientific organizations)
- specialized training by instrument manufacturers
- attendance at scientific meetings

- enrollment in college/university courses
- specialized training manuals
- participation in check-sample or proficiency sample programs

ERT maintains a commitment to provide analytical services of the highest quality. ERT strives to fulfill this obligation by employing the most qualified personnel available and to maintain their high level of professional competence through a comprehensive training program. The Handbook establishes mimimum requirements for initial and continuing training.

3. FACILITIES AND EQUIPMENT

ERT recognizes the importance of facilities and equipment to the quality of data generated. Therefore, the analytical services laboratory has been planned and assembled to ensure the quality and acceptance of analytical data.

3.1 Laboratory Work Space

The analytical services complex consists of several discrete laboratories. Separate areas have been established for sample receipt and storage, glassware cleaning, sample preparation, trace level and grossly contaminated sample preparation, and instrumental analyses. Adequate space exists in each laboratory to ensure safe and accurate sample handling.

3.2 Lighting

Lighting is provided by overhead fluorescent lights and is conducive to the function being performed.

3.3 Cleanliness

Cleanliness is important to laboratory effectiveness and appearance. Every effort is made to maintain clean, clutter-free work areas. Storage of materials and supplies on bench tops is discouraged and time is allotted regularly for lab cleanup as prescribed by the Handbook.

3.4 Safety Rules

Safety rules are established by the ERT Health and Safety Committee. These rules are posted in the laboratory and are enforced in all laboratory areas. Every employee is expected to review and obey these rules. Rules specific to laboratory operations are outlined in detail in the Handbook.

3.5 Safety Equipment

Safety equipment is provided in each laboratory. The Handbook gives detailed instructions on the location and proper use of all safety equipment and for maintaining records on equipment use and servicing.

3.6 Ventilation

Air exchange information is valuable data for the laboratory. Periodic velocity measurements of hoods and vents are conducted and recorded. A hood face velocity of 100 cubic feet/minute is considered minimum for safe use. The Handbook sets out specific routines for collection and tracking of the data obtained.

3.7 Compressed Air

Compressed air of known quality is purchased from an outside supplier. For high purity analyses, this supplier is required to provide certification of quality through an analysis report.

3.8 Electrical Power

Laboratory electric power supply, at both 110 volts and 220 volts, is considered adequate for the functions being performed. Each laboratory has a separate electric service. The systems are adequately grounded and have voltage regulation where necessary for proper instrument operation, as outlined in the Handbook.

3.9 Water Supply

The laboratory potable water source is the city of Newbury Park public water supply. This water is also used to produce the deionized water supply used in the laboratory.

3.10 Chemical Storage

Proper storage of chemicals and solvents is provided in the laboratory, taking into consideration compatability, flammability and reactivity. Neat chemicals are dated upon receipt and stored in a central storage area. Supplies of solvent are stored in a locked area away from the laboratory. Solvents in use are stored in vented, fire proof cabinets located in the laboratories. The purity of each lot of solvent is checked before use. Procedures for recording, filing and updating inventory are outlined in the Handbook.

3.11 Sample Storage

A separate secured area is provided for sample storage before and after analysis to minimize the potential for cross-contamination. This facility includes refrigeration and freezer units for samples requiring low temperature storage. Samples and sample extracts are held for specified length of time after issuance of a final report. The client is then contacted for written authorization before disposal. Samples will be archived upon client request. The Handbook prescribes the required forms, routing and filing of all storage information, as well as its use in sample history and documentation.

3.12 Waste Disposal

Disposal of chemical wastes generated in the laboratory is in accordance with all appropriate regulations. The Handbook details the specific reporting requirements necessary to fulfill regulatory obligations and to ensure documentation of safe disposal.

4. INSTRUMENTATION: MAINTENANCE AND CALIBRATION

Since instrumental methods of analysis require properly maintained and calibrated equipment, the operation and maintenance of modern analytical instrumentation is of primary importance in the production of acceptable data. In order to provide this data, ERT subscribes to the following programs:

- maintenance agreements/service contracts with instrument manufacturers
- laboratory preventative maintenance program
- laboratory equipment calibration program

Minimum requirement for each program are set in the Handbook.

4.1 Maintenance

Individual instrument logbooks are maintained for each piece of equipment which include pertinent instructions concerning both maintenance and calibration. Information contained in the logbook would include:

- Inventory information
  equipment name, model number, serial number, manufacturer, date of acquisition, original cost
- Service tasks and intervals
  cleaning, calibration, operation based on the manufacturer's recommended schedule and previous laboratory experience
- Service record
  date of breakdown, date of return to service, downtime, problems, repairs, cost of repairs, who performed the repairs, parts required, etc.

- calibration/performance checks
- daily operational notes

Copies of applicable forms, instruction in their use, and filing and updating requirements are detailed in the Handbook.

4.2 Calibration

A separate instrument file is maintained and includes calibration procedures. A calibration procedure for each piece of equipment should contain:

- list of specific equipment or types of equipment for which it is applicable
- general discussion of the scope and theory of calibration technique
- specifications, i.e., calibration points, environmental requirements, accuracy requirements, permissible error limits
- list of calibration standards and accessory equipment
- instructions for recording the calibration data in the logbook
- instructions for corrective actions to be taken if calibration is outside specifications or guidelines

In addition, manufacturer operation and instruction manuals are maintained on file in the laboratories. The Handbook provides details for calibrating each laboratory instrument and contains sample forms and instructions for their use.

5. OPERATIONS

5.1 Glassware

All glassware used in the laboratory is maintained in good condition. Glassware that is chipped, cracked or otherwise defective is either discarded or repaired. Only volumetic glassware with a class "A" certification is used.

5.2 Reagents, Solvents, Gases and Standards

Chemical reagents and solvents of the best quality supplied by reputable chemical suppliers are used in the Laboratory. Materials of ACS or analytical reagent grade rating are considered to be of minimum acceptable purity. Reagents are dated when received and if the manufacturer lists no expiration date then one is assigned based on the nature of the reagent. Solvents are checked for purity before use. Compressed gases are certified as ultra high purity by the supplier. Cylinders are changed when the contents reach a predetermined pressure. Molecular seive filters are placed on gas lines supplying instruments. Analytical standards are purchased at a certified concentration or purity. Documentation is maintained on the preparations and use of standards as prescribed in the Handbook.

5.3 Equipment Performance Checks

Most laboratory equipment undergoes routine performance evaluations. Each piece of equipment has a schedule, an evaluation procedure and performance logbook.

Refrigerators and freezers are checked daily to ensure that they are operating properly and within established temperature ranges. Routine maintenance such as defrosting are performed as needed. All information is recorded in a QA logbook.

The water purification systems are checked daily by measuring conductivity. Samples of the water are also routinely analyzed by GC/MS for organic contamination. Maintenance procedures and schedules are outlined in the systems logbooks.
The Handbook establishes the responsibility for taking daily measurements, samples of forms, instructions for their use, and sets operational criteria and procedures for corrective action.

5.4 Glassware Cleaning

Laboratory glassware is scrupulously cleaned prior to use. Different cleaning procedures exist for different types of analyses. SOP's have been written for each of the different procedures. The Handbook outlines procedures for insuring that proper procedures are used and documented.

5.5 Sample Preservation and Storage

When samples are received unpreserved, ERT personnel will preserve samples according to U.S. EPA recommendations, unless instructed otherwise. This will be done at the time of sample log-in. Sample storage facilities have been designed to isolate grossly contaminated samples from trace environmental samples. Separate refrigerators, freezers and ambient storage areas are maintained. Detailed regulations are provided in the Handbook for determinimg proper preservative and storage.

5.6 Reagent Inventory

An inventory of reagents will be maintained to assure an adequate supply for most applications. The manufacturers lot number will also be tracked to minimize contamination problems. The Handbook outlines specific requirements for preparing, updating and documenting reagent inventories.

6. SAMPLE ANALYSIS

ERT's quality assurance program is structured to ensure both the integrity and accuracy of reported analytical data. This entails checks at points throughout the sample analysis scheme; these checks include sampling blanks, recovery studies, and verification of compound identity.

6.1 Methods

Analytical methods employed by the laboratory are only those validated and recommended by an oversight organization or developed at ERT. These include U.S. Environmental Protection Agency methods and standard methods (APHA, ASTM, USGS, Calif. ARB, NIOSH). Field samples are collected, shipped and stored in a manner consistent with avoiding contamination or sample degradation, and includes submission of field blanks to verify the lack of contamination after sampling. Samples are stored at reduced temperatures and only within the holding periods established by the U.S. EPA.

Sample preparation is carried out by skilled professionals using accepted procedures for the various sample types and parameters of interest. Sample extracts are stored before analysis at reduced temperatures in a manner consistent with preventing contamination or tampering. The Handbook prescribes procedures for preparation, use and update of SOP's, documentation of analytical methods used, and tracking of sample preparation history.

6.2 Quality Control

To ensure the accuracy of reported results the laboratory employs secondary verification, control blanks, recovery samples and replicate analyses as required by the Handbook and summarized below.

When assigning a specific identify to a chromatrographic peak, the laboratory uses several methods to verify that identification. These include dual (GC) column analysis, the standard addition technique, the use of labelled compounds as surrogates in GC/massspectral analysis, and the use of two different detectors where appropriate.

Quite important to determining sample concentration levels is a knowledge of how much analyte was recovered from the original sample. The laboratory assesses recoveries for <u>every</u> sample set received by analyzing quality control samples which contain most or all of the parameters of interest. These QC samples are standards obtained from the U.S. EPA (EMSL). As an additional check, the laboratory may also employ its own QC-spiked recovery samples. Both types are carried through the entire analytical procedure in the same manner as the client's samples.

To assure accurate measurements replicate analyses are performed for client samples as well as quality assurance samples. This enables the laboratory to validate the accuracy of measurements. Reagent blanks are also carried through the entire procedure as an additional check on the integrity of the results and a check on glassware interference and experimental contamination. Requirements for preparation, analysis and reporting of quality control data are detailed in the Handbook.

6.3 Method Validation

Before a new method or a modified method is employed in the lab it must be validated. To validate a method, several in-house QA samples of various concentrations are put through the preparation and analysis sequence. The concentrations of the recoveries, duplicates and blanks are calculated to determine the method detection, accuracy, precision, interference and thus, efficiency. In addition, samples are spiked (either standard additions or labelled surrogates) to verify indentifications made via the new method. The end result is the preparation of an ERT SOP. The Handbook furnishes requirements for all phases of new method development.

7. DOCUMENTATION AND RECORDS

Records are the means by which an organization documents its operations and activities. They are an integral part of the Quality Control program for they provide documented evidence for program functionability and necessary information for performance evaluation and quality assurance audits. A major function of the Handbook is to provide a final data file which meets the most rigid documentation requirements.

7.1 Standard Operating Procedures

Standard Operating Procedures (SOP's) are written for specific procedures or operations. Complex tasks of inspection, testing, calibration, monitoring, maintenance, data handling, interpretation, report preparation and process control will be recorded and documented by a specific SOP. Many SOPs are a parts of a complete methodology. For instance, one SOP describes soxhlet extraction; however, several SOPs may be combined to create a method such as the analysis of PAH in soil. It is the responsibility of all personnel to observe the requirements of SOPs. The Handbook sets forth a specific format for generation of SOPs, as well as requirements for their use.

7.2 Sample Tracking

The laboratory must keep records of the locations and amounts of samples from the time they are received until they are disposed. In the field, the identity of the sample must be established by the field sampler. A chain-of-custody must be initiated and a label attached to each sample. These documents require detailed information.

Once in the laboratory the sample custodian must continue the chain-of-custody by commenting on the condition of the sample container, making sure the sample received is the sample collected, assigning each sample a sequential laboratory sample number and signing and dating. One of the chain-of-custody copies is submitted to the field sampler, one is filed in the laboratory files, and one goes to the section supervisor.

The sample custodian then logs the sample lab number (in consecutive order) into a bound incoming logbook and decides on its proper storage location, which is dependent on the type of analysis and probable concentration of contaminants. Finally, a sample usage log is started for each sample. This log tracks the transport and use of the sample within the lab until it is properly disposed. This final action is logged onto the sample usage sheet and chain-of-custody which is submitted to the field sampler.

The Handbook describes each phase of sample tracking, with sample forms, furnishes detailed instructions for the completion of all forms and regulates the documentation procedures.

7.3 Standards and Traceability

When a standard is prepared it is given a consecutive standard number and pertinent information such as compound, lot number, manufacturer, % activity, storage location, expiration date, solvent or carrier, amount, final volume, balance used, and date and signature of when and who prepared it are logged into a bound standard logbook. In addition, all stock standards are given a maximum use designation depending on the stability of the standard material. The Handbook furnishes procedures for determing the shelf-life of standards as well as procedures for documenting degradation. Any dilutions of this stock standard are recorded onto a serial dilution sheet which is filed with the data in which it was used for analysis.

7.4 Maintenance Logs

Maintenance logs are kept for each instrument, as described earlier. These logs are not only a history of instrument response but can be helpful in troubleshooting the instrument. The Handbook furnishes procedures for completing and updating maintenance logs for each instrument.

7.5 Data Packages

A data package is a collection of sample preparation and analysis work sheets and raw data. Each work sheet has spaces to complete with the needed information, for that portion of the method, that will be utilized in later portions of the analytical method. With the contents of each package anyone should be able to reconstruct how the final sample and QA/QC data results were achieved. The laboratory can offer a variety of data reports of increasing complexity depending on the needs of each client. The Handbook details the minimum requirements for a data package and report as well as the specific contents of each increasingly complex data report.

7.6 Data Review

All data packages are reviewed by the analyst, resource manager and QA/QC coordinator according to specific requirements of the Handbook; including signatures, verifications, etc.

7.7 Control Limits

Control limits for both precision and accuracy are established for each analysis as soon as possible. A 95% confidence interval is calculated after sufficient samples have been analyzed. Additional QC data is added on a routine basis to determine whether each a set of analyses is "in control" and to look for trends in method performance. The Handbook describes procedures for computerized statistical analysis of QC data and furnishes requirements for generation and update of confidence intervals for each type of analysis and sample matrix.

7.8 Filing System

Filing systems are set up in the most convenient and accessible fashion. Data packages are filed first alphabetically by client, then chronologically. Chain-of-custody's, incoming sample log books andsample usage logs are also filed chronologically. The Handbook establishes minimum requirements for secure and complete data files, describes data access procedures, and details long-term data storage procedures.

8. QUALITY ASSURANCE

ERT's Newbury Park Analytical Chemistry Laboratory is willing to participate in interlaboratory tests and performance checks to provide periodic assessment of the effectiveness of our overall quality control program.

8.1 Interlaboratory Performance Surveys

Although not presently in place, performance surveys conducted by the EPA and the California Air Resources Board may constitute the bulk of interlaboratory comparisons.

ERT's performance may be evaluated by the respective agency after each round of testing, and would be reported to ERT's Laboratory Quality Assurance Officer. The Laboratory Quality Control Coordinator summarizes the results in a report to the Corporate QA Manager who reports to upper management. Procedures for use, analysis, and reporting of QA reference samples are detailed in the Handbook.

8.2 Periodic In-House Audits

In-house auditing is conducted by the National Laboratory QC Manager, with the assistance of the Laboratory QC Coordinator. These audits occur at least every 6 months, and are typically focused on a specific project. In-house audits take two forms - performance audits and systems audits. Performance audits involve submittal of blind spikes to the laboratory by the Quality Assurance Department for assessment of analytical accuracy. Systems audits consist of a thorough review of project procedures and documentation to confirm that work was performed in accordance with the project QA Plan and that adequate documentation exists to satisfy the project requirements. The Handbook gives specific instructions for responding to audits and implementing corrective action.

8.3 QA Reporting and Corrective Action

Project performance and systems audits are reported formally to project management and to corporate management. Items requiring corrective action are documented on a Corrective Action Request Form addressed to the project manager. The Corrective Action Request is a three-part NCR-type form. The first copy is retained by QA upon issuance. The project manager receives the original and one copy. When satisfactory progress has been achieved on each requested action, the project manager or designee enters descriptions of actions and results on the form, then retains the copy and returns the original to QA to close the loop.

Results of interlaboratory performance surveys and in-house audits, along with unresolved correction action items are summarized in a quarterly report from the Quality Assurance Manager to the President.

December , 1982

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby
General Manager

Gentlemen:

Background Hydrogeologic Data
Hewitt Landfill
North Hollywood, California

Pursuant to our telephone conversation of November 29, 1982, we are submitting this letter concerning nearby wells, water levels, and ground water quality in the vicinity of the Hewitt Landfill Site.

The Hewitt site is a closed landfill located in the central portion of the Tujunga Wash alluvial fan in the San Fernando Valley. Sand and gravel were mined at the site from 1930 to 1960, resulting in a pit some 145 feet deep. This pit was then filled with landfill refuse. The elevation of the site is about 750 feet above sea level and the base of the landfill refuse is at about 605 feet above sea level.

The locations of water wells in the vicinity of the site are shown on Plate 1, Well Location Map. There are other wells in the area, however, the wells shown on Plate 1 are those for which historic water level and water quality data are available.

Water level elevations for the years 1956 through 1979 at Well 1N/15W-1Q2 are shown on Plate 2, Hydrograph. Well 1N/15W-1Q2 is located about one-half mile south of the site. The water level elevation at this well was 521.8 feet above sea level in 1979, corresponding to a depth of about 228 feet below ground surface at the site and about 83 feet below the base of landfill refuse. The historic high water level at Well 1N/15W-1Q2 was 579.9 feet above sea level in 1956 or about 25 feet below the base of landfill refuse at the site. Due to continued pumping of ground water and basin management, it is unlikely that water levels will ever again reach the historic high level. The California Department of Water Resources (1979) conducted a theoretical model study on the potential for ground water storage in the San Fernando Basin. If the Basin is used to store State Water Project water in the future, the model study indicates that ground water levels would rise approximately 40 feet. Using the water level data for 1979, the water surface at the

DRAFT

site would be at about Elevation 562 feet. This level is about 43 feet below the base of the landfill and would not impact on landfill refuse at the site.

Chemical analyses of ground water from several nearby wells are given in Table 1, Ground Water Quality at Well Near Hewitt Landfill. These wells were selected because several analyses, taken over a period of time, were available for these wells.

If you have any questions regarding this letter or if we can be of further service, please contact us.

Yours very truly,

LeROY CRANDALL AND ASSOCIATES

by
Joan Oberholtzer
Staff Geologist

by
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB-JO/jj
Attachment
(copies submitted)

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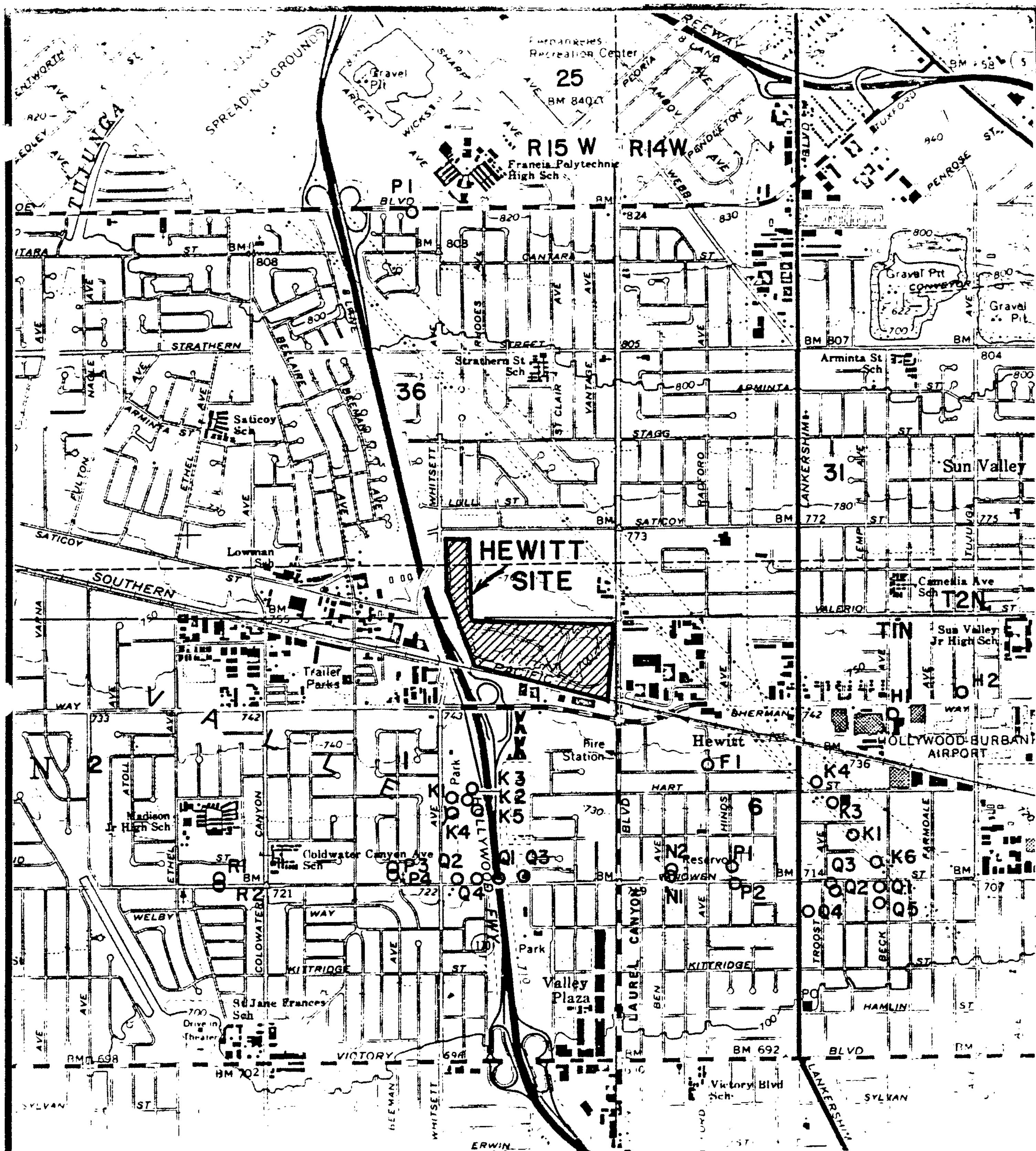


REFERENCE :
BASE MAP U.S.G.S. 7.5' QUADRANGLE
VAN NUYS 1966, PHOTOREVISED , 1972

0 2000 4000

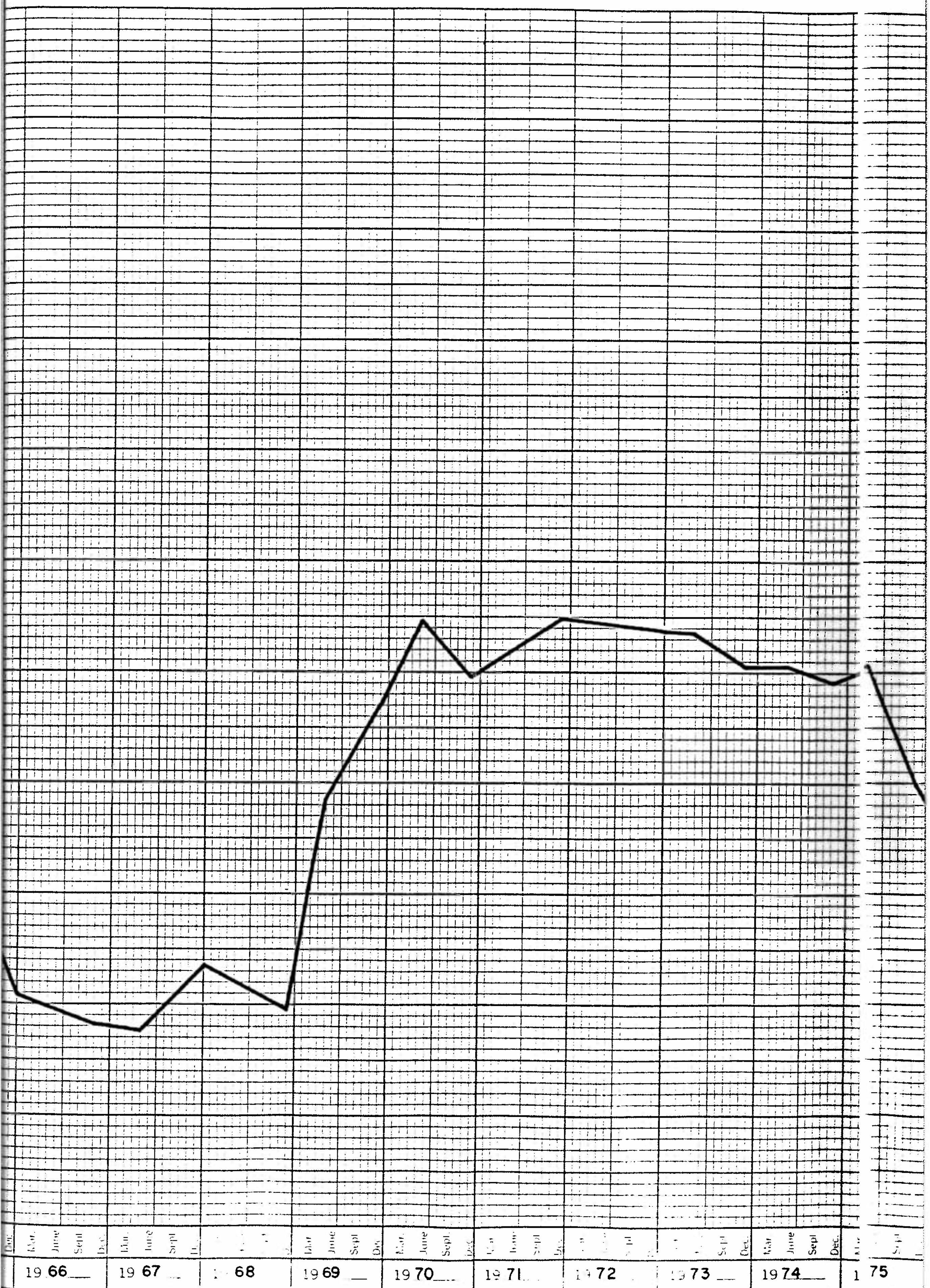
SCALE IN FEET

WELL LOCATION MAP

LeROY CRANDALL AND ASSOCIATES

PLATE I

JOB E-81001 DATE 12-7-82 DR. ____ Q.E. ____ CHKD. JD



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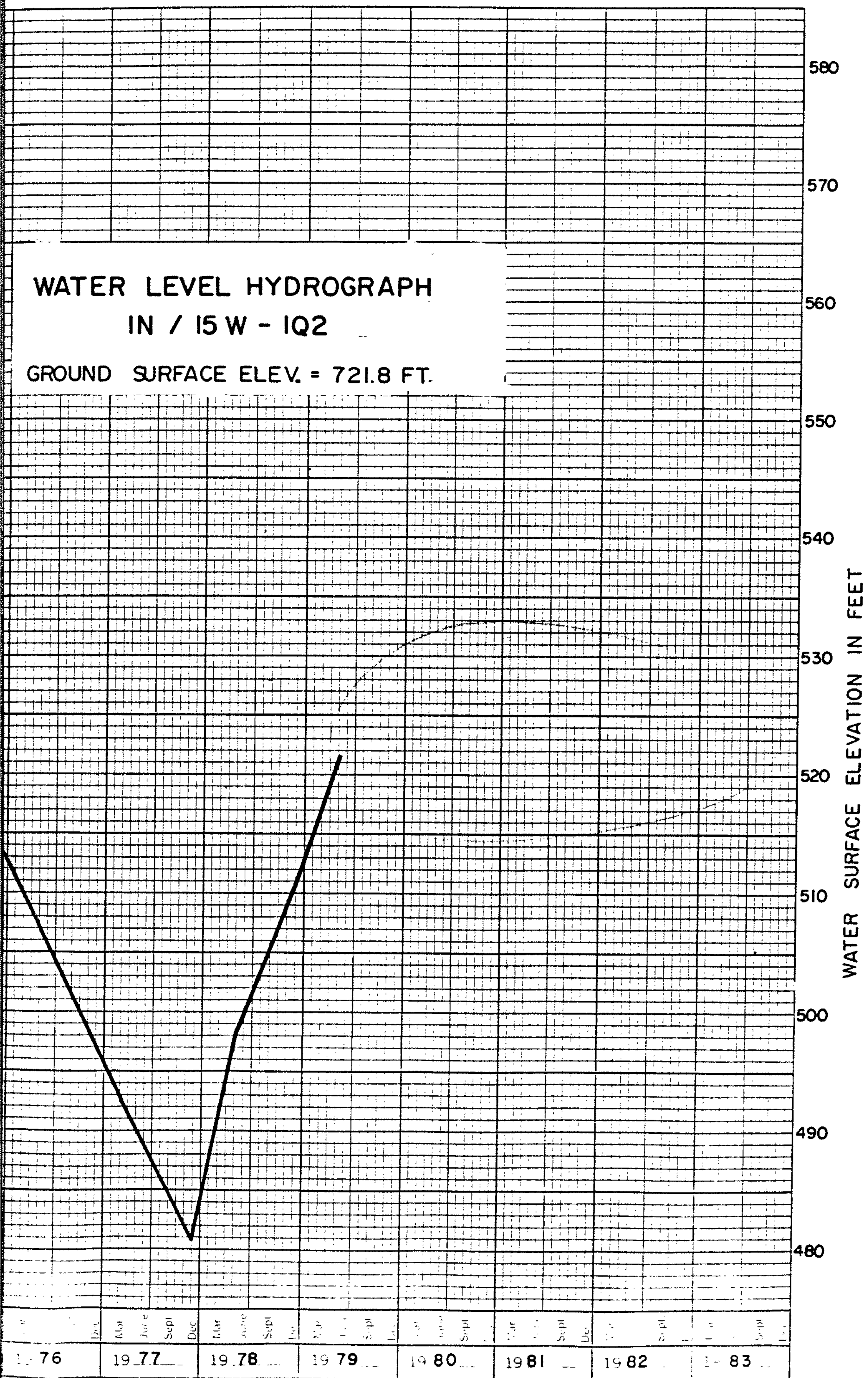


WATER LEVEL HYDROGRAPH
IN / 15 W - 1Q2
GROUND SURFACE ELEV. = 721.8 FT.
580
570
560
550
540
530
520
510
500
490
480
WATER SURFACE ELEVATION IN FEET
19 77
19 78
19 79
19 80
1981
19 82

PLATE 2

TABLE

GROUND WATER QUALITY AT W .S NEAR HEWITT LANDFILL

WELL NUMBER	DATE SAMPLED	$EC \times 10^6$ AT 25°C	pH	MINERAL CONSTITUENTS IN PARTS PER MILLION												TDS IN PPM
				Ca	Mg	Na	K	$CaCO_3$	HCO_3	SO_4	Cl	NO_3	F	B		
1N/14W-6N1	10-12-71	520	7.6	61	15	20	2.9	169		49	20	25	.3			312
1N/14W-6N1	10-04-73	503	7.7	62	12	21	3.0	165		45	17	20.0	.3			279
1N/15W-1K2	07-06-65	709	8.0	80	20	41	4.0	201		126	25	12.0	.4			449
1N/15W-1K2	06-20-72	761	7.8	89	25	45	3.9	204		171	27	9.0	.4			541
1N/15W-1Q2	07-16-70	950	8.1	101	31	59	2.8	218		239	24	20.0	.4			628
1N/15W-1Q2	10-11-73	955	7.7	101	31	63	3.0	212		263	23	22.0	.4			633
T2N/R15W-25P1	05-25-71	808	7.3	89	21	52	5.0	363		36	14	2.2	.3			463
T2N/R15W-25P1	10-19-73	670	7.6	80	15	47	4.0	312		35	11	6.7'	.4			386

February 12, 1985

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby

Gentlemen:

Correction of Completion Report Dated 01-03-85
Construction of Upgradient Monitoring Well No. 1
Hewitt Landfill, North Hollywood District,
Los Angeles County, California, For Valley Reclamation

It has been called to our attention that there was an error on Page 5 of the subject completion report. The error has been corrected, and corrected copies of the page are enclosed for insertion in your report copies.

Please accept our apologies for this error and the resulting inconvenience.

Respectfully submitted,

LeROY CRANDALL AND ASSOCIATES

by *Alice M Campbell*
Alice M. Campbell, C.E.G. 1157
Senior Staff Geologist

by *Glenn A Brown*
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB:AC/jj6cc
Enclosures
(5 copies submitted)

cc: Los Angeles Regional Water Quality Control Board
Attn: Mr. Dick Harris
Los Angeles Department of Water and Power
Attn: Mr. Mel Blevins
Attn: Mr. Tom Gibson
Los Angeles Bureau of Sanitation
Attn: Ms. Sheila Molyneux

January 3, 1985

Valley Reclamation Company
3200 San Fernando Road
Los Angeles, California 90065

(Our Job No. E-81001)

Attention: Mr. George Cosby

Gentlemen:

Submitted herewith is our completion report for the new upgradient well. The report contains a description of well construction details and alluvial materials beneath the well site.

Respectifully Submitted,

LeROY CRANDALL AND ASSOCIATES

by Alice M Campbell
Alice M. Campbell, C.E.G. 1157
Senior Staff Geologist

by Glenn A Brown
Glenn A. Brown, C.E.G. 3
Director of Geological Services

GAB:AC/jj4r
(5 copies submitted)

cc: Los Angeles Regional Water Quality Control Board
Attn: Mr. Dick Harris
Los Angeles Department of Water and Power
Attn: Mr. Mel Blevins
Attn: Mr. Tom Gibson
Los Angeles Bureau of Sanitation
Attn: Ms. Sheila Molyneux

COMPLETION REPORT

CONSTRUCTION OF UPGRADIENT MONITORING WELL NO. 1

HEWITT LANDFILL, NORTH HOLLYWOOD DISTRICT

LOS ANGELES COUNTY, CALIFORNIA

FOR

VALLEY RECLAMATION COMPANY

INTRODUCTION

This report describes the construction of the Hewitt Landfill upgradient Monitoring Well No. 1. The monitoring well is designed and located to allow measurement of ground water quality upgradient of the closed Hewitt Landfill facility, and to provide background water level data. The monitoring well is placed to allow detection of any ground water degradation from upgradient sources. Plate 1, Well Location Map, shows the location of the monitoring well with respect to the Hewitt site. The well is located in the southern parkway of the North Saticoy Street cul-de-sac, approximately 100 feet west of the Hollywood Freeway.

CHRONOLOGY OF WORK

All work pertaining to the location and construction of the well was carried out in accordance with the design details prepared for the well by our office. All work related to construction and development of the wells was conducted by Howard Pump Company of Barstow, California, under the observation of LeRoy Crandall and Associates. The work was carried out between October 29 and November 1, 1984.

WELL CONSTRUCTION AND DEVELOPMENT

The mud rotary drilling method was used to construct the monitoring well. The well was constructed by drilling a 12¼-inch borehole to design depth. An Electric Log of the well was made after borehole drilling and prior to casing installation. An 8-5/8 inch outer diameter steel casing was placed in the borehole. The well casing is perforated in the lower 160 feet with milled slots. The annular area of the borehole was backfilled with rounded, clean pea gravel (3/8-inch) to 10 feet above the perforations. A layer of bentonite pellets was installed over the gravel pack. The remaining annular area was sealed with a lean concrete mix from the top of the bentonite to ground surface. Table 1 contains pertinent well construction information. Plate 2, Well Construction Details, illustrates the construction details of the monitoring well. Appendix A contains the E-Log, Water Well Drillers Report and Test Pump Data.

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

MW No.	Ground Surface Elevation	Borehole Depth (ft.)	Casing* Depth (ft.)	Casing Perforated**		Gravel Packed		Sealed	
				From	To	From	To	From	To
1	769	290	290	120	280	110	290	0	110

NOTE: (*) All casing 8-5/8-inch O.D. steel casing. (**) Casing perforated with 3/32 x 2-1/2-inch milled slots, 18 slots per foot. (MW) Monitoring Well.

The well was developed by pumping at rates up to 100 gpm with an electric submersible pump. The well was pumped first for 6½ hours, and then for 30 hours. At the end of the development phase, water samples were collected. At the time of sampling, the water was clear.

HYDROGEOLOGIC CONDITIONS

Borehole drilling encountered alluvial sands and gravels with occasional boulders and fine grained layers, similar to those found throughout this part of the San Fernando Valley. Ground water was encountered at a depth of 213 feet, which corresponds to an elevation of 546 feet above sea level.

WATER QUALITY

General

The water samples collected at the end of the development period were immediately sent to Brown and Caldwell Laboratory in Pasadena, and by the Los Angeles Regional Water Quality Control Board to the State laboratory. The water samples were analyzed for volatile organic compounds and general mineral content. The results of both sets of analyses are in Appendix B. The general mineral quality of the water shows that it meets general drinking water standards for inorganic compounds. Excessive levels of trace organics, however, will require treatment to produce acceptable drinking water.

Inorganic

The following Table 2 shows the mineral quality objectives for the area of the Hewitt Landfill, and the results from the new monitoring well. The information is taken from the Regional Water Quality Control Board (RWQCB) Basin Plan (1975), Appendix C.

TABLE 2
MINERAL QUALITY OBJECTIVES FOR GROUND WATERS

	Objective (mg/l)			
San Fernando Subunit:	TDS	Sulfate	Chloride	Boron
North Hollywood-Burbank Area:	600	250	100	1.5
Monitoring Well Water Quality:				
Well No. 1	420	220	22	---

The general mineral quality in the vicinity of he Hewitt Landfill is within the RWQCB objectives. The water is a calcium bicarbonate type with high (300 ppm) total hardness. The pH is slightly alkaline and total dissolved solids are moderate.

Organic

The RWQCB has not yet established organic compound objectives for water in the San Fernando Valley. However, the EPA has made available water quality criteria for some toxic pollutants. At a 1 per million risk level, the EPA exposure estimates are shown in the following table.

TABLE 3
EPA WATER QUALITY CRITERIA - 45 FR 79318
(10^{-6} Risk Level)

TCE	2.7 ug/l
PCE	0.8 ug/l
Carbon Tetrachloride	0.40 ug/l
1, 2, DCA	0.94 ug/l

TABLE 4
SUMMARY OF TCE AND PCE DATA
October, 1984
(ug/l)

	Brown and Caldwell	Department of Health Services
Well:	#1	#1
PCE	3	--
TCE	0	--
All Other	31	25

Using these figures as guidance, the ground water upgradient of the closed Hewitt Landfill could be considered marginally suitable for drinking without treatment.

In addition to the constituents already named, other compounds are present which indicate ground water contamination. These compounds include petroleum hydrocarbons, xylenes, benzene, and toluene. These compounds are found in gasoline and diesel fuel. The levels of these compounds vary from less than 1 ug/l to over 20 ug/l (total) in the new monitoring well.

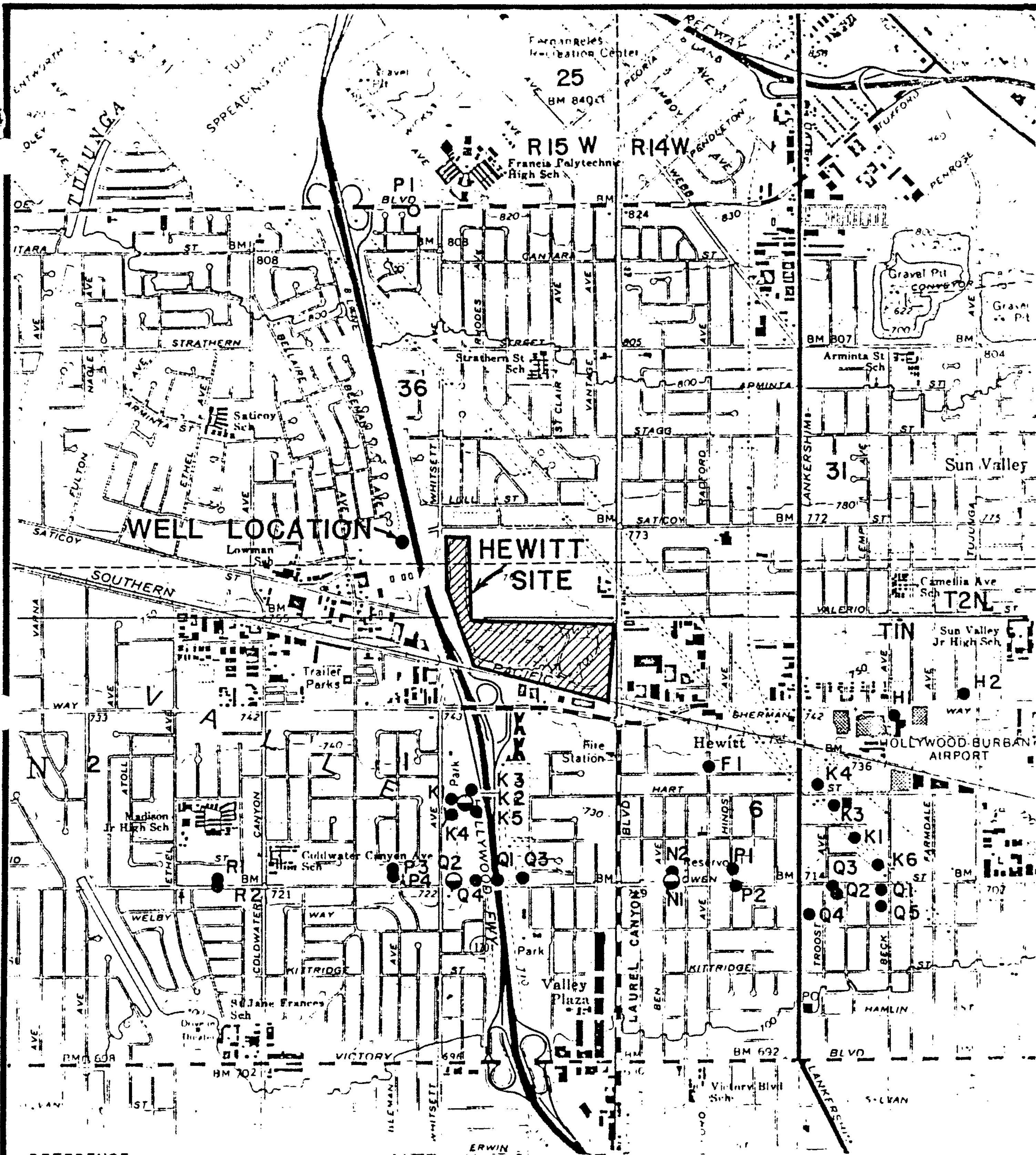
CONCLUSIONS

1) On the basis of our observation of well construction, the well was completed as designed. No unusual or unexpected geologic conditions were encountered during drilling. The well should, therefore, be suitable its intended purpose as a monitoring well.

2) Evidence of contamination of ground water was obtained from the well. The type of contamination indicates that the source is probably aged gasoline and industrial solvents, and that the sources are located upgradient of the Hewitt Landfill.

-oOo-

The following are attached and complete this report.



REFERENCE :
BASE MAP U.S.G.S. 7.5' QUADRANGLE
VAN NUYS 1966, PHOTOREVISED, 1972.

EXPLANATION :
● WELL
◐ WELL WITH HYDROGRAPH OR WATER QUALITY DATA

0 2000 4000
SCALE IN FEET

N

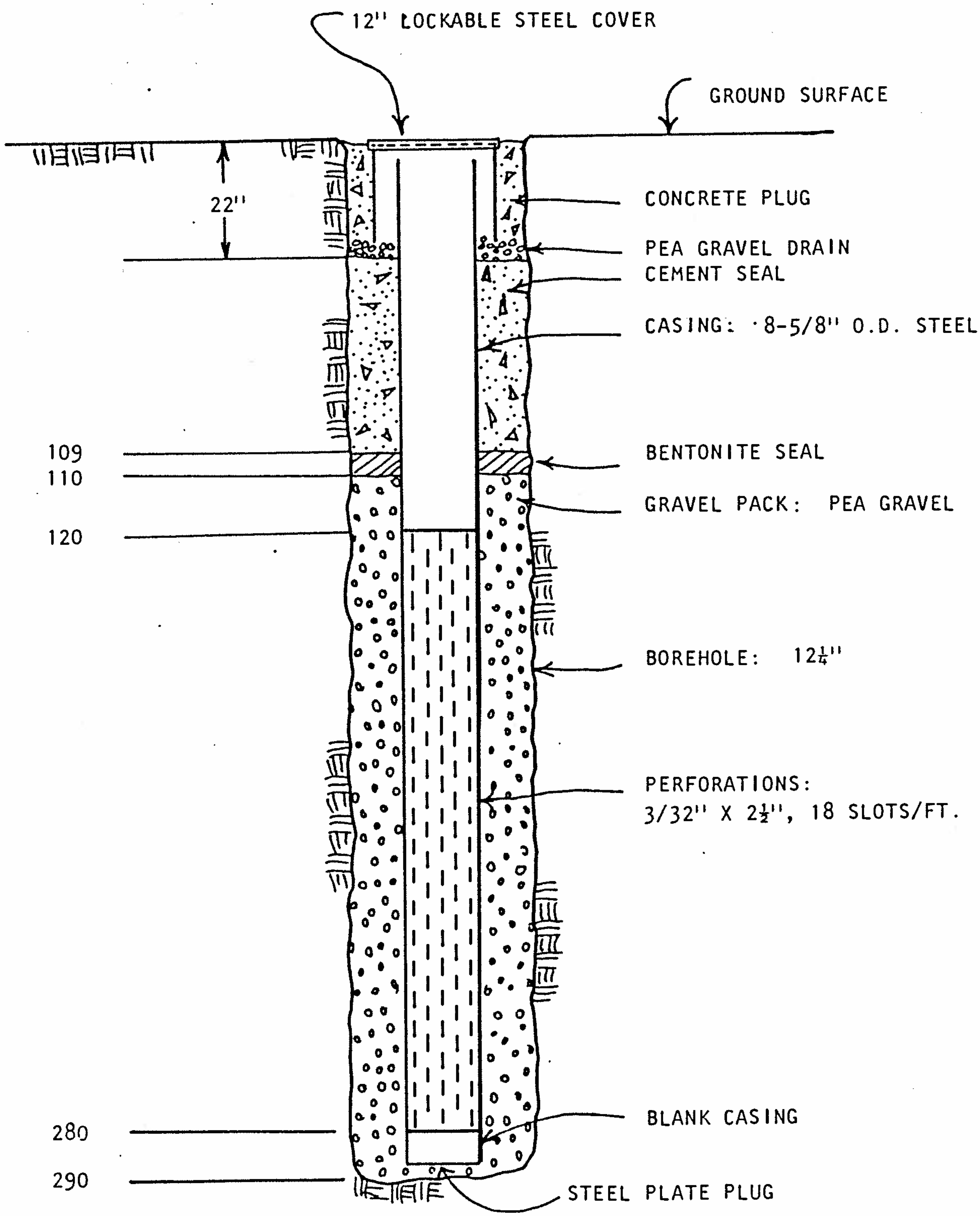
WELL LOCATION MAP

LeROY CRANDALL AND ASSOCIATES

PLATE 1

FORM 120 JOB E 81001 DATE 12-8-82 DR. M.G. C.F. J.O. W.P. CHKD JO

NOT TO SCALE



CONSTRUCTION DETAILS
HEWITT MONITORING WELL No.1

LeROY CRANDALL AND ASSOCIATES

PLATE 2

JOB E-81001 DATE 12-6-84 DR. C.E. W.P. CHKD

FORM 120

APPENDIX A

welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO

COMPANY Howard Pump, Inc

WELL Hewitt Upgradient

FIELD North Hollywood

STATE California COUNTY Los Angeles

LOCATION: Saticoy St. 30' W of end near Hollywood Fwy.

SEC. TWP RGE

OTHER SERVICES None

Permanent Datum: G.L. Elev.

Log Measured From G.L. Ft. Above Perm. Datum

Drilling Measured From G.L.

Elev.: K.B. D.F. G.L.

Date	10-31-84			
Run No.	ONE			
Depth—Driller	293'			
Depth—Logger	293'			
Btm. Log Inter.	292'			
Top Log Inter.	27'			
Casing—Driller	– @	@	@	@
Casing—Logger	–			
Bit Size	12¼"			
Type Fluid in Hole	MUD			
Dens. | Visc.	–			
pH | Fluid Loss	| ml	| ml	| ml	| ml
Source of Sample	CIRCULATED			
R_m @ Meas. Temp.	4.0 @ 88 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	6 HOURS			
Max. Rec. Temp.	– °F	°F	°F	°F
Equip. | Location	FV | BFL			
Recorded By	D.L. CRAIG			
Witnessed By	H.S. CAMPBELL			

FIELD PRINT

This Heading and Log Conform To API RP 31

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other

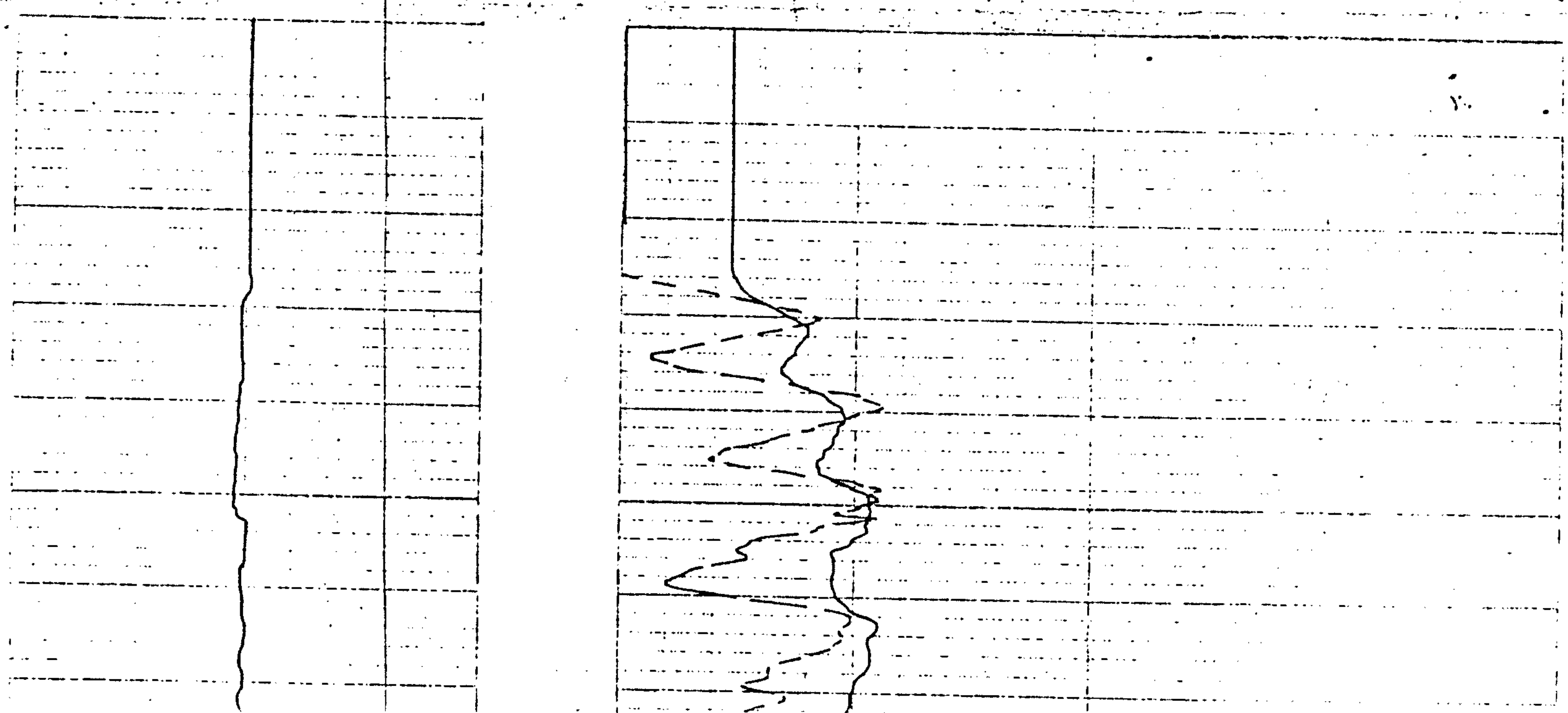
REMARKS

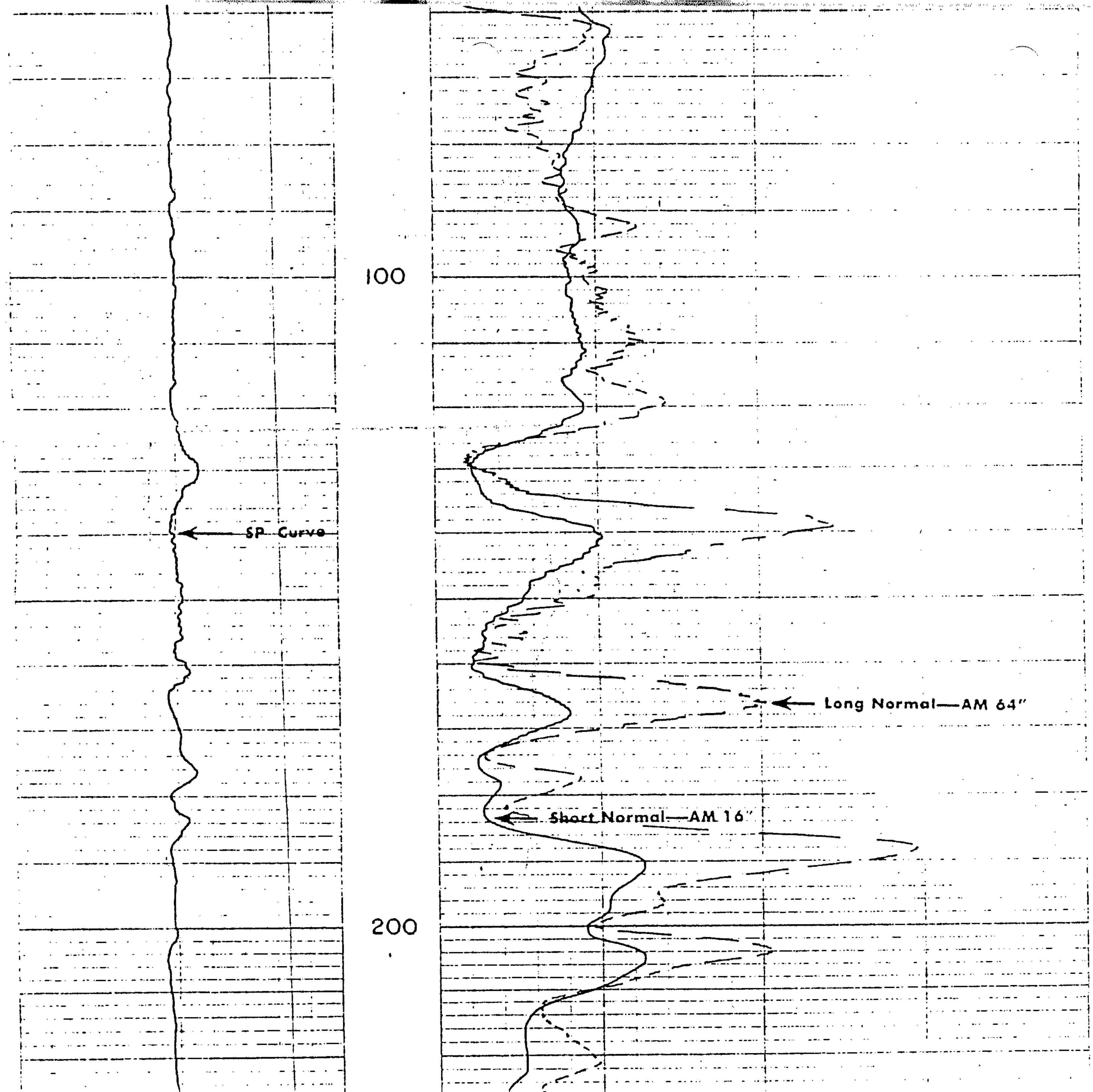
Changes in Mud Type or Additional Samples

Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens.	Visc.	pH	Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.
							ml		@ °F	@ °F

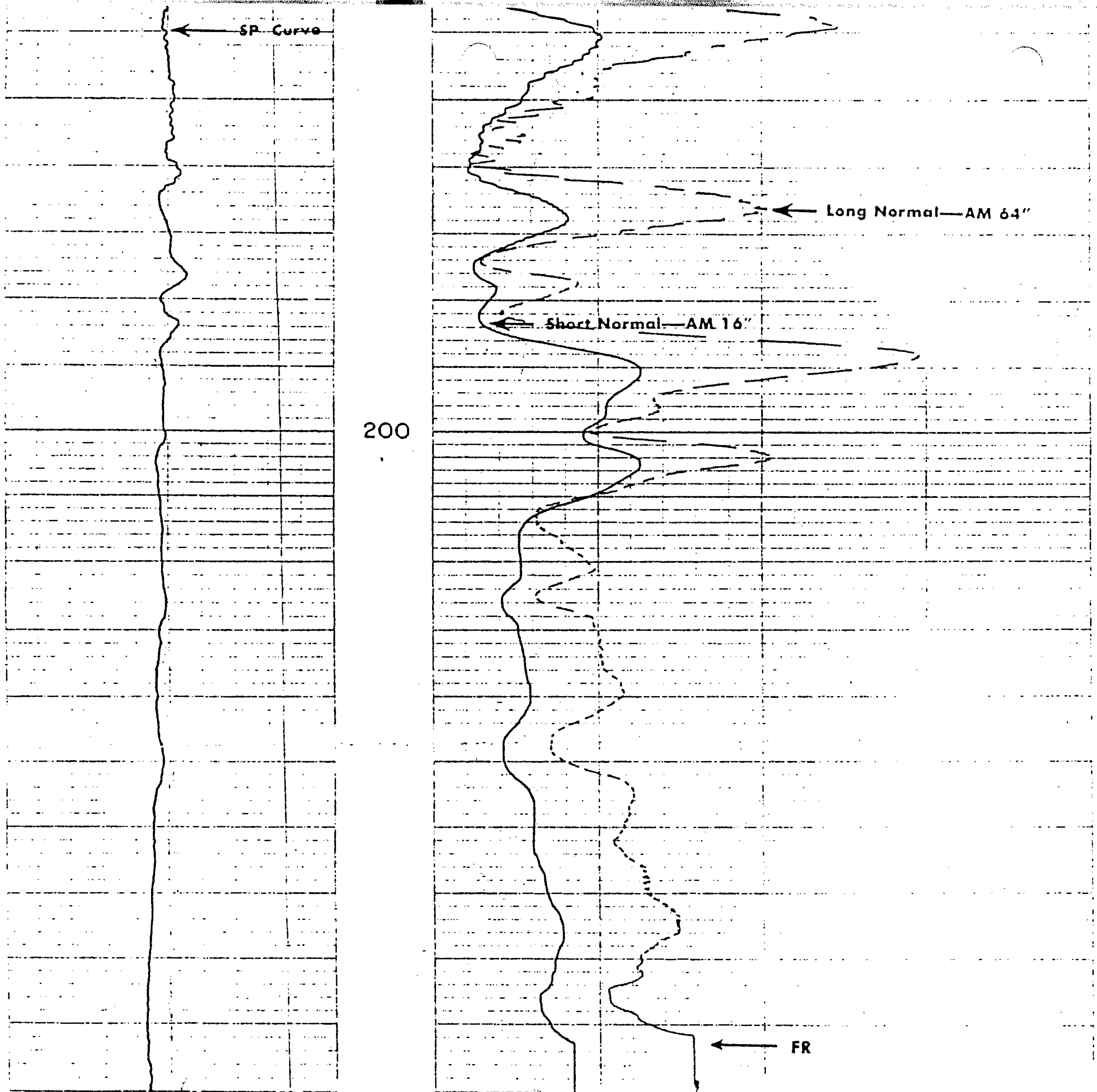
					Run No.	Tool Type	Pad Type	Tool Position	Other
R_m @ Meas. Temp.	@	°F	@	°F	ONE	ELECTRIC LOG		FREE	
R_{mf} @ Meas. Temp.	@	°F	@						
Source: R_{mf} | R_{mc}									
R_m @ BHT	@	°F	@	°F					
R_m @ BHT	@	°F	@	°F					
R_m @ BHT	@	°F	@	°F					

SPONTANEOUS POTENTIAL millivolts	Depths	RESISTIVITY ohms. m²/m	RESISTIVITY ohms. m²/m
+		SHORT NORMAL 16 Inch — 0 … 100	
		LONG NORMAL 64 Inch — 0 … 100	RESISTANCE Detail Curve





SP Curve
100
200
Long Normal—AM 64"
Short Normal—AM 16"


SP Curve
Long Normal—AM 64"
Short Normal—AM 16"
200
FR

ORIGINAL
File with DWR

N[illegible] Intent No. Customer
Loc[illegible] Permit No. or Date Customer

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 241871
State Well No.

CBI

[redacted]

HOWARD PUMP, [illegible]
TEST PUMP D. [illegible]A

NAME Valley Reclamation WELL DESIGNATION/LOCATION Hewitt Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS ______ TEST ______ SHEET ___ OF ___

DATE/ TIME 11-6-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
11:00		100		213		
11:05			2	215	Some	
12:25		100	2	215	Little	
1:28		100	2	215	None	
2:30		100	2	215	None	Pump running fine, 32 amps.
3:00		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	Shut down.
11-7-84						
6:00		100	2	215	None	Started pump, slightly cloudy discharge, cleared up quick
7:00		100	2	215	None	
9:00		100	2	215	None	
10:30		100	2	215	None	Poured cement around vault.
11:30		100	2	215	None	
12:30		100	2	215	None	
2:00		100	2	215	None	
3:30		100	2	215	None	
4:30		100	2	215	None	
5:30		100	2	215	None	
6:00		100	2	215	None	Shut Down.

HOWARD PUMP, I...
TEST PUMP DATA

NAME Valley Reclamation WELL DESIGNATION/LOCATION ~~Hewitt~~ Landfill STATIC WATER LEVEL 213'

ADDRESS 3200 San Fernando Rd. WELL DIAMETER 8" AIRLINE 271'

Los Angeles, CA 90069 WELL DEPTH 290' PUMP SETTING 271'

LENGTH OF TEST IN HOURS ___ TEST ___ SHEET ___ OF ___

DATE/ TIME 11-8-84	SPECIFIC CAPACITY	DISCHARGE RATE	DRAWDOWN	PUMPING LEVEL	SAND CONTENT	REMARKS
6:30		100	2	215	None	
7:30		100	2	215	None	
8:30		100	2	215	None	
9:30		100	2	215	None	
11:00		100	2	215	None	
12:00		100	2	215	None	End Test.

APPENDIX B

BROWN AND CALDWELL ANALYTICAL LABORATORIES

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

Corrected Report
12/17/84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Carbonate Alk (as CO3), mg/L	0.0
Bicarbonate Alk (as HCO3), mg/L	300
Hydroxide Alk (as CaCO3), mg/L	0.0
Calcium (EDTA Titration), mg/L	11
Magnesium, mg/L	14
Chloride, mg/L	3.2
Copper, mg/L	<0.06
Surfactants, mg/L	<0.1
Iron, mg/L	<0.059
Manganese, mg/L	<0.032
pH, Units	7.8
Potassium, mg/L	3.5
Sodium, mg/L	34
Sulfate, mg/L	220
Specific Conductance, umhos/cm	830
Filterable Residue, mg/L	420
Zinc, mg/L	<0.013
Nitrate (as NO3), mg/L	15

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 (818) 795-7553 (213) 681-4655

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Purgeable Priority Pollutants	
Extraction	11/19/84
:rolein, ug/L	<10
..crylonitrile, ug/L	<10
Ethylbenzene, ug/L	3
Tetrachloroethylene, ug/L	3
Toluene, ug/L	8
Other Purgeable Priority Pollutants, ug/L	<1
Semi-Quantified Results **	
Xylene Isomers, ug/L	20

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard

Edward Wilson

Edward Wilson, Laboratory Director

HEWITT

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84 (Leave Blank) Lab. No. 13588

Purveyor and Address (include city and county): VALLEY RECLAMATION-HEWITT PIT

System Number: ☐☐☐☐☐☐☐ — Serial Number: C 07970

Sampling Point: NEW WELL #1 - WEST

Collected by: Ramstedt — Date and Hour Collected: 11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

		(mg/l as $CaCO_3$)		TRACE ELEMENTS	
☐ Ca		☐ Hardness		☐ Al	
☐ Mg		☐ HCO_3		☐ Ag	
☐ Fe Total		☐ CO_3		☐ As	
☐ Mn		☐ OH		☐ B	
☐ Na		☐ Total Alk.		☐ Cd	
☐ K		☐ Cl		☐ Cr	
☐ pH		☐ SO_4		☐ Cu	
☐ Total Dissolved Solids		☐ F		☐ Hg	
		☐ NO_3		☐ Pb	
				☐ Ni	
				☐ Se	
				☐ Zn	
				☐	

☑ Other analyses desired (specify):

VOA

see attached sheet

Date Reported: 11-9-84 — Analyst: PH

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84 (Leave Blank) Lab. No. 13589

Purveyor and Address (include city and county): VALLEY RECLAMATION-HEWITT PIT

System Number: ☐☐☐☐☐☐☐ — Serial Number: C 07974

Sampling Point: TRIP BLANK

Collected by: Lab-(SCR) — Date and Hour Collected: 11-8-84 1130

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other TRIP BLANK

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

		(mg/l as $CaCO_3$)		TRACE ELEMENTS	
☐ Ca		☐ Hardness		☐ Al	
☐ Mg		☐ HCO_3		☐ Ag	
☐ Fe Total		☐ CO_3		☐ As	
☐ Mn		☐ OH		☐ B	
☐ Na		☐ Total Alk.		☐ Cd	
☐ K		☐ Cl		☐ Cr	
☐ pH		☐ SO_4		☐ Cu	
☐ Total Dissolved Solids		☐ F		☐ Hg	
		☐ NO_3		☐ Pb	
				☐ Ni	
				☐ Se	
				☐ Zn	
				☐	

☑ Other analyses desired (specify):

VOA

Chloropicrin [illegible]
Trace = 0.25 ug/l

Date Reported: 11-9-84 — Analyst: PH

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

STATE OF CALIFORNIA - HEALTH AND WELFARE AGENCY
DEPARTMENT OF HEALTH SERVICES
PUBLIC AND ENVIRONMENTAL H[illegible]TH DIVISION (213) 620-3376

SOUTHERN CALIFORNIA LABORATORY SECTION
1449 West Temple Street, Room 101
Los Angeles, California 90026

HEWITT PIT
NEW WELL #1

AN ATTACHMENT TO LAB-804

SAMPLES FOR CHEMICAL ANALYSIS

LAB NUMBER: 13588

SERIAL NUMBER: C 079 70

ANALYST: P.H

DATE REPORTED: 11-9-84

VOA
1. n-pentane
2. Petroleum distillate hydrocarbon C_6
3. Dipropyl ether
4. Benzene = 0.54 ug/l
5 toluene = 7.2 ug/l
6, Perchloroethylene = 1.9 ug/l
7. Ethyl benzene = 2.3 ug/l
8. M, P - Xylenes = 9.8 ug/l
9 O - Xylene = 3.4 ug/l
10. n-propyl benzene = trace
11. Ethyl toluene isomers
12 trimethyl benzene isomers
13 3A, 4, 7, 7A - tetrahydro - 4, 7 - methanoindene
14 Indan

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section

SAMPLE FOR CHEMICAL ANALYSIS

Date Received	
Lab. No. (Leave Blank)	13590
Purveyor and Address (include city and county)	VALLEY RECLAMATION HEWITT PIT
System Number	
Serial Number	C 07971
Sampling Point	NEW WELL #1-WEST
Collected by	RAMETBOT
Date and Hour Collected	11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS (mg/l as Ca CO_3)

☐ Ca		☐ Hardness	
☐ Mg		☐ HCO_3	
☐ Fe Total		☐ CO_3	
☐ Mn		☐ OH	
☐ Na		☐ Total Alk.	
☐ K		☐ Cl	
☐ pH		☐ SO_4	
		☐ F	
☐ Total Dissolved Solids		☐ NO_3	

TRACE ELEMENTS

☐ Al	
☐ Ag	
☐ As	
☐ B	
☐ Cd	
☐ Cr	
☐ Cu	
☐ Hg	
☐ Pb	
☐ Ni	
☐ Se	
☐ Zn	
☐	

☑ Other analyses desired (specify):

BNA

Naphthalene = trace

Date Reported	Analyst
11-21-84	P.A

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. μmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section

SAMPLE FOR CHEMICAL ANALYSIS

Date Received	11-8-84
Lab. No. (Leave Blank)	13587
Purveyor and Address (include city and county)	VALLEY RECLAMATION HEWITT PIT
System Number	
Serial Number	C 07972
Sampling Point	New Well #1-WEST
Collected by	RAMETBOT
Date and Hour Collected	11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other OBS WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☑ GENERAL MINERAL ANALYSIS (mg/l as Ca CO_3)

☐ Ca	80.	☐ Hardness	205.
☐ Mg	1.2	☐ HCO_3	274.
☐ Fe Total	<0.1	☐ CO_3	0.
☐ Mn	<0.02	☐ OH	0.
☐ Na	58.	☐ Total Alk.	274.
☐ K	3.7	☐ Cl	25.
☐ pH	7.8	☐ SO_4	45.
		☐ F	0.2
☐ Total Dissolved Solids	455	☐ NO_3	14.

TRACE ELEMENTS

☐ Al	
☑ Ag	<0.001
☑ As	<0.01
☐ B	
☑ Cd	<0.001
☑ Cr	<0.01
☑ Cu	<0.01
☑ Hg	<0.001
☑ Pb	<0.01
☑ Ni	<0.05
☑ Se	<0.01
☑ Zn	<0.01
☑ Ba	0.143

☑ Other analyses desired (specify):

(HM)

Sb — < 0.02 mg/l

Be — < 0.01 mg/l

Tl — < 0.01 mg/l

Cr+6 — = <.001 mg/l

Date Reported	Analyst
11-21-84	ST ML CL

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. μmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section

SAMPLE FOR CHEMICAL ANALYSIS

Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT	Date Received: 11-8-84	(Leave Blank) Lab. No. 13586
Sampling Point: NEW WELL #1 - WEST	System Number	Serial Number: C 07973
	Collected by: RAMSTEDT	Date and Hour Collected: 11-8-84 12:15

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other: GW WELL

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

GENERAL MINERAL ANALYSIS		(mg/l as Ca CO3)		TRACE ELEMENTS		Other analyses desired (specify)
☐ Ca		☐ Hardness		☐ Al		COD — 1 mg/L
☐ Mg		☐ HCO_3		☐ Ag		CN⁻ — <0.001 mg/L
☐ Fe Total		☐ CO_3		☐ As		Phenol - 0.002 mg/L
☐ Mn		☐ OH		☐ B		
☐ Na		☐ Total Alk.		☐ Cd		
☐ K		☐ Cl		☐ Cr		
☐ pH		☐ SO_4		☐ Cu		
☐ Total Dissolved Solids		☐ F		☐ Hg		
		☐ NO_3		☐ Pb		
				☐ Ni		
				☐ Se		
				☐ Zn		Date Reported: 11-9-84
				☐		Analyst: RS

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section

SAMPLE FOR CHEMICAL ANALYSIS

Date Received: 11-8-84	(Leave Blank) Lab. No. 13586
System Number:	Serial Number: C 07973
Purveyor and Address (include city and county): Valley Reclamation Hewitt Pit	
Sampling Point: New Well #1 - West	
Collected by: Ramstedt	Date and Hour Collected: 11-8-84 12:15

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs. Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS

		(mg/l as Ca CO_3)	
☐ Ca		☐ Hardness	
☐ Mg		☐ HCO_3	
☐ Fe Total		☐ CO_3	
☐ Mn		☐ OH	
☐ Na		☐ Total Alk.	
☐ K		☐ Cl	
☐ pH		☐ SO_4	
		☐ F	
☐ Total Dissolved Solids		☐ NO_3	

TRACE ELEMENTS

☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

COD - 1 mg/l

CN^- - <0.001 mg/l

Phenol - 0.002 mg/l

Date Reported	Analyst
11-9-84	RS

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

COMPLETION REPORT

CONSTRUCTION OF SECOND DOWNGRADIENT MONITORING WELL

HEWITT LANDFILL

LOS ANGELES, CALIFORNIA

Project No. 58-7057

December 30, 1987

Cal Mat Properties
3200 San Fernando Road
Los Angeles, California 90065

Project No. 58-7057

Attention: Mr. George Cosby

Gentlemen:

Completion Report
Construction of Second Downgradient
Monitoring Well - Hewitt Landfill
Los Angeles, California

The completion report for the new Second Downgradient Monitoring Well for Hewitt Landfill is attached. This well was installed as part of the landfill SWAT program. The report includes construction details, and a description of materials encountered.

If you have any questions regarding this information, please do not hesitate to contact us.

Yours very truly,

LAW ENVIRONMENTAL, INC.

Vincent A. Richards

by
Vincent Richards
Staff Geologist

by Glenn A. Brown
Glenn A. Brown, C.E.G. 3
Senior Vice President

COMPLETION REPORT

CONSTRUCTION OF SECOND DOWNGRADIENT MONITORING WELL

HEWITT LANDFILL

LOS ANGELES, CALIFORNIA

Project No. 58-7057

INTRODUCTION

This report describes the construction of CalMat Company's Second Downgradient Well at the Hewitt Landfill. The well is located in the North Hollywood District of Los Angeles, California, 800 feet north of the northwest corner of Sherman Way and Laurel Canyon Boulevard (see Figure 1).

Well drilling, casing construction, and development of the Second Downgradient Well was provided by Howard Pump, Inc. of Barstow, California. Geophysical logging of the borehole was provided by Welenco, Inc. of Bakersfield, California. Logging of the alluvial materials penetrated, documentation of construction practices, well design, and testing were provided by Law Environmental, Inc. of Burbank, California. All work related to well design and construction supervision was carried out in accordance with verbal authorization from Mr. George Cosby.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geologist practicing in this or similar localities. No other warranty, expressed or implied is made as to the professional advice included in this report.

REFERENCE: BASE MAP FROM U.S.G.S
7½' VAN NUYS QUADRANGLE, 1972

N

WELL LOCATION MAP

SECOND DOWNGRADIENT WELL
HEWITT LANDFILL

SCALE 1"=2000'

FIGURE 1

LAW ENVIRONMENTAL, INC.

JOB ____ DATE ____ DR. ____ E. ____ W.P. ____ CHKD ____

FORM 1?

HYDROGEOLOGIC CONDITIONS

The lithologic log of the well is presented in Appendix A. The material penetrated by the boring consists of Pleistocene alluvial material derived from San Gabriel Mountains to the north. The alluvial material is predominantly sand and sandy gravel with numerous cobble zones and occasional interbeds of clay and silt. The clay and silt layers became more prominent below 280 feet. The lithologic log indicates that the alluvial materials beneath the site are highly permeable. Ground water was encountered below 250 feet in unconfined conditions.

WELL CONSTRUCTION

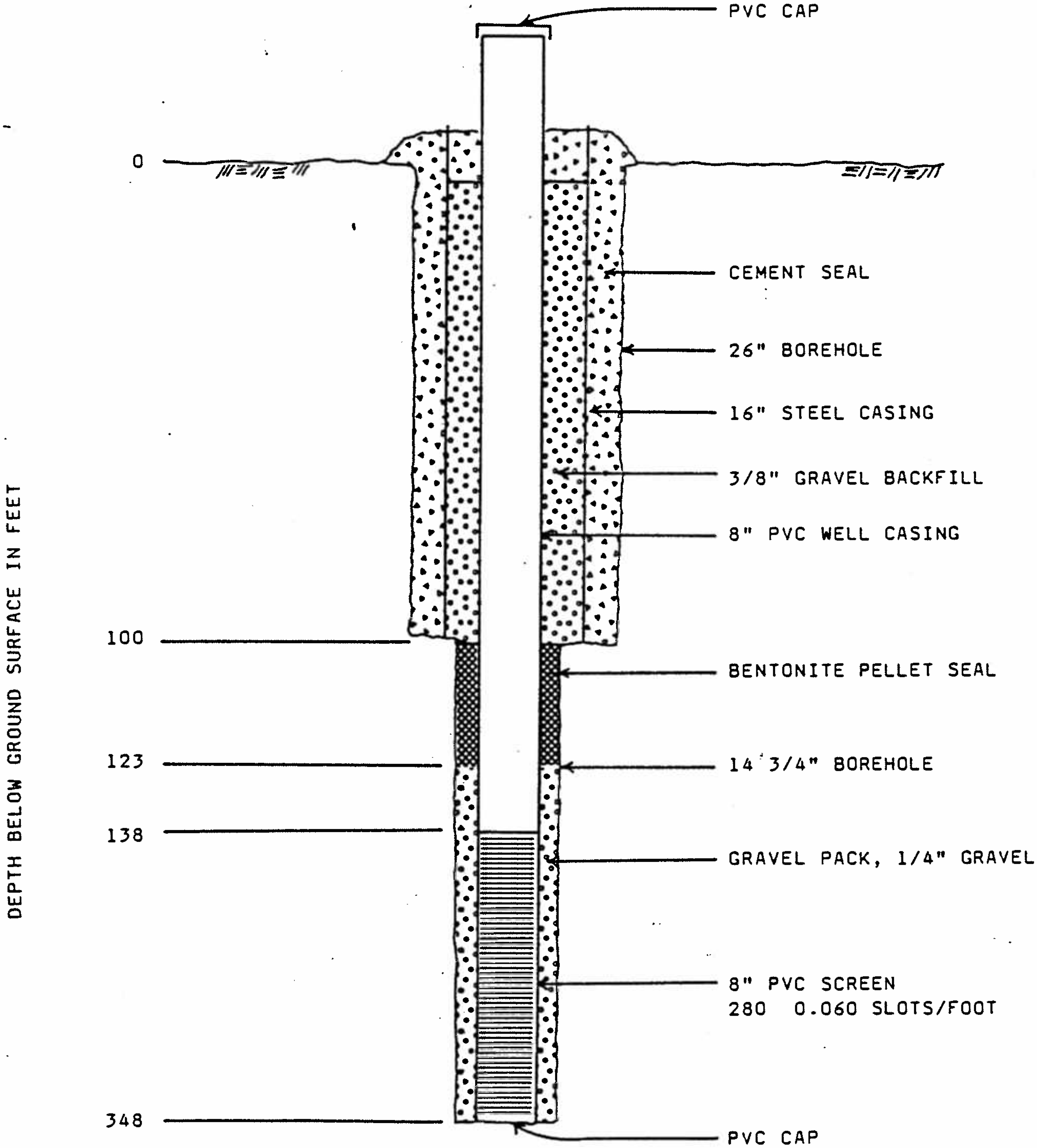
Drilling commenced on November 23, 1987 using a conventional rotary mud method and bentonite drilling mud to stabilize the borehole and remove drill cuttings.

On November 25, 1987, a 9-7/8-inch-diameter pilot hole was drilled to a final depth of 348 feet, and geophysical logging of the borehole was performed (Appendix B). Based on review of the lithologic, gamma-ray, and electric logs, a final well design was completed.

On December 1, 1987, a 26-inch conductor borehole was drilled to a total depth of 100 feet. A 16-inch-diameter conductor was set in the borehole and cemented into place. On December 4, 1987, the well borehole was reamed to a 14-3/4-inch diameter and a total depth of 348 feet below ground surface on December 4, 1987. On December 7, the drilling mud in the borehole was thinned and 8-inch PVC casing and screen placed to the bottom of the borehole. Schedule 80 PVC slotted casing, 280 0.060-inch slots/foot, was set between the depths of 138 feet and 348 feet. Well construction details are presented on Figures 2 and 3. The annular space between the borehole and well screen was filled by 1/4-inch crushed gravel using a Bobcat loader. The gravel pack was placed to 123 feet below ground surface and covered with bentonite pellets, which filled the borehole to the bottom of the conductor casing. The remainder of the borehole was filled with 3/8-inch gravel to the surface.

WELL DEVELOPMENT

Well development was conducted in two separate phases. On December 9 and 10, the well was bailed using a 6-inch bailer for a total time of eight hours. Partial clearing of the water was observed. On December 16, the well was partially developed using a 6-inch turbine pump set at 300 feet. Development consisted of surging the well by the on-off action of the pump. Discharge



NOT TO SCALE

WELL CONSTRUCTION DETAIL

SECOND DOWNGRADIENT WELL

FIGURE 2

LAW ENVIRONMENTAL, INC.

JOB ____ DATE ____ DR. ____ O.E. ____ W.P. ____ CHKD ____

FORM 120

MONITORING WELL CONSTRUCTION DETAILS
WELL NO. - SECOND DOWNGRADIENT WELL

JOB NAME CAL MAT PROPERTIES Job No. 58-7057
Date Construction Commenced 11-23-87 Completed 12-7-87
Drilling Contractor Howard Pump
Supervision By VINCE Richards - STEVE McArdle Signature

WELL LOCATION
State CALIFORNIA County LOS ANGELES City
Coordinates

BOREHOLE DRILLING
Conductor Borehole: Depth 100 feet Diameter 26 inches
Drilling Method ROTARY Drilling Fluid BENTONITE + FRESH WATER
Well Borehole: Depth ~~352~~ 348 feet Diameter 14 3/4 inches
Drilling Method ROTARY Drilling Fluid BENTONITE + FRESH WATER

WELL CONSTRUCTION
Conductor Casing Material STEEL ASTM
Length 100 feet ID 16 inches Wall .25 inches
Well Casing Materials SCHEDULE 80 PVC FLUSH THREADED ASTM
Length 138 feet ID 8 inches Wall inches
Well Screen Type ~~SCHEDULE 80 PVC~~ 0.060" SLOTS FLUSH THREADED
Material PVC SCHEDULE 80 ASTM
Length ~~200~~ 210 feet ID 8 inches Wall inches
Slots/foot 280 Length inches Width inches
Filter Pack Material 1/4" CRUSHED GRAVEL Sieve Sizes 4x20
Placement Method DUMP
Sealant Materials BENTONITE PELLETS Volume 19 cu. feet
Volume cu. feet
Placement Method GRAVITY
Protective Well Cap Type PVC CAP
Well Development Procedure BAILING + ~~PUMP~~ TURBINE PUMPING
Duration 12 hours Volume Pumped 40,000 gallons

WELL TESTING
Date of Test 12/17/87 Type CONSTANT DISCHARGE Duration 2.5 hours
Discharge Rate 200 gpm Pumping Water Level ~~250.3~~ 253.5 feet
Specific Capacity 167 gpm/ft Static Water Level 252.3 feet
Sand Content <1 mg/l Drawdown 1.2 feet
Turbidity CLEAR Odors NONE
Elec. Conductance micromhos/cm pH Temperature 60 °C

REFERENCE ELEVATIONS
Surface Elevation feet Top of Casing Elevation feet
Reference Point Elevation for Water Level Measurements feet
Description of Reference Point

REMARK

FIGURE 3

ranged from 50 to 220 gpm. During the discharge period, no visual turbidity was noted.

AQUIFER TESTING

On December 17, a short aquifer test was made on the well. Using the 6-inch turbine pump set at 300 feet, a constant discharge of 200 gpm was held for 2.5 hours. Drawdown was measured by use of an air line and pressure gauge. A summary of these measurements and test data are included in Appendix C.

The available field data from the pump test on the well indicates a transmissivity of 44,000 gpd/ft and an approximate permeability of 4.6×10^2 g/ft^2/d. Calculations are shown in Appendix D.

CURRENT STATUS

On December 18, 1987, the turbine pump was withdrawn from the well, and the well is now awaiting permanent installation of a monitoring pump.

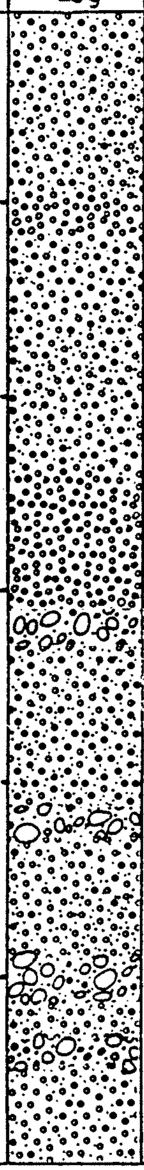
APPENDIX A

LITHOLOGIC LOG

LITHOLOGIC LOG

Owner: CalMat Properties
Well No. Second Downgradient
Drilled by: Howard Pumps
USGS No.
Location: CalMat Storage Yard, 800' North of the NW corner of Sherman Wy. and Laurel Cny.

Drilling method: Mud Rotary
Date completed: 12-7-87
Borehole depth: 348 Ft.
Borehole diameter: 14 3/4 inches
Casing: PVC Sch. 80, 2 Ft. above ground to 133 Ft.
Perforations: PVC Sch. 80 w/280 0.060 slots/foot 138-348 Ft.
Static water level: 252.3 Ft.
Drawdown: 1.2 Ft. Yield: 200 gpm
Specific capacity: 167 gpm/ft
Electrical conductance: micromhos
Ground elevation:
Top of casing elevation:

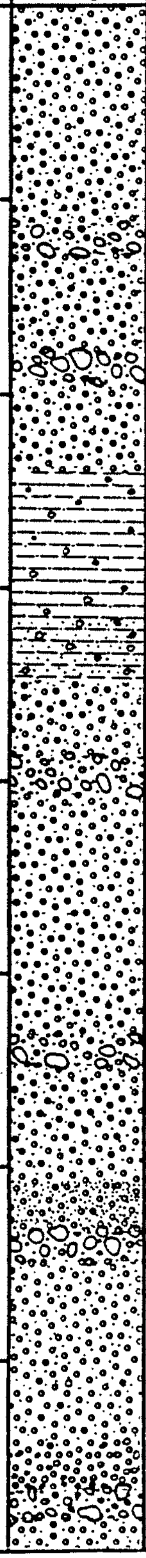


Depth	Graphic Log		Description of Materials
0		SAND & GRAVEL	Predominantly grey to brown fine to coarse grained sand with varing amounts of quartz rich gravel and approximately 5% micaceous silt
20			Increasing gravel 30% and coarse grained sand
40			
			At 50' 80% pea gravel, predominantly quartz diorite and granite
60			Chatter
			Brown to tan sand with gravel
80			Chatter
100			Chatter
			Sand grain size decreasing, with silt increasing
			Chatter
			Sand increasing
120			

Remarks: Conductor casing: 16 inch diameter steel casing 0-100 feet

LITHOLOGIC LOG

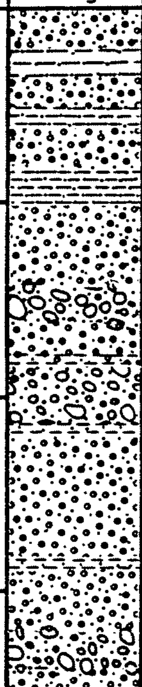
Second Downgraient
Well No. Well



Depth	Graphic Log		Description of Materials
120			Fine to medium sand
140			Chatter
160			Chatter
		SILTY CLAY	Brown silty clay with a small amount of fine to coarse grained sand and gravel. Some plasticity, sand increasing with depth
180			
		SAND & GRAVEL	Brown to grey, fine to coarse grained sand with varying amounts of gravel
200			Chatter
220			Chatter
240			Sandier
			Chatter
260			
			Increasing gravel content
			Chatter
280			

LITHOLOGIC LOG

Second Downgradient
Well No. Well



Depth	Graphic Log		Description of Materials
280		SANDY CLAY to CLAYEY SAND	Brown sandy clay and clayey sand with gravel and occasional cobbles, clay increasing with depth
300		SAND & GRAVEL	Brown, fine to coarse grained sand with gravel, and occasional clay and cobble interbeds
			Chatter
320			Chatter
340			
			Chatter
			Total Depth - 348 Feet
360			

APPENDIX B

GEOPHYSICAL LOGS

2166-01286

welenco

WELL ENGINEERING SURVEYS

ELECTRIC LOG

FILING NO.

COMPANY HOWARD PUMP, INC. / LAW ENVIRONMENTAL, INC.

WELL HEWITT Second Down Gradient Well

FIELD NORTH HOLLYWOOD

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION: CAL MAT SELF STORAGE
A 33

SEC. ____ TWP ____ RGE ____

OTHER SERVICES: GAMMA-RAY

Permanent Datum: G.L., Elev. ____
Log Measured From G.L., ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____
D.F. ____
G.L. ____

Date	11-25-87			
Run No.	ONE			
Depth—Driller	352'			
Depth—Logger	349'			
Btm. Log Inter.	348'			
Top Log Inter.	8'			
Casing—Driller	- @	@	@	@
Casing—Logger	-			
Bit Size	9-7/8"			
Type Fluid in Hole	BENTONITE & POLYMER MUD			
	-			
Dens. | Visc.	N/A |	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD DITCH			
R_m @ Meas. Temp.	12.5 @75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	13.3 @75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	1.5 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	CU-1 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. MC ARDLE			

Fold Here

This Heading and Log Conform To API RP 31

REMARKS

Changes in Mud Type or Additional Samples: Date | Sample No. | Depth—Driller | Type Fluid in Hole | Dens. | Visc. | ph | Fluid Loss ml | Source of Sample | R_m @ Meas. Temp. @ °F | R_{mf} @ Meas. Temp. @ °F | R_{mc} @ Meas. Temp. @ °F | Source: R_{mf} | R_{mc} | R_m @ BHT @ °F | R_{mf} @ BHT @ °F | R_{mc} @ BHT @ °F

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

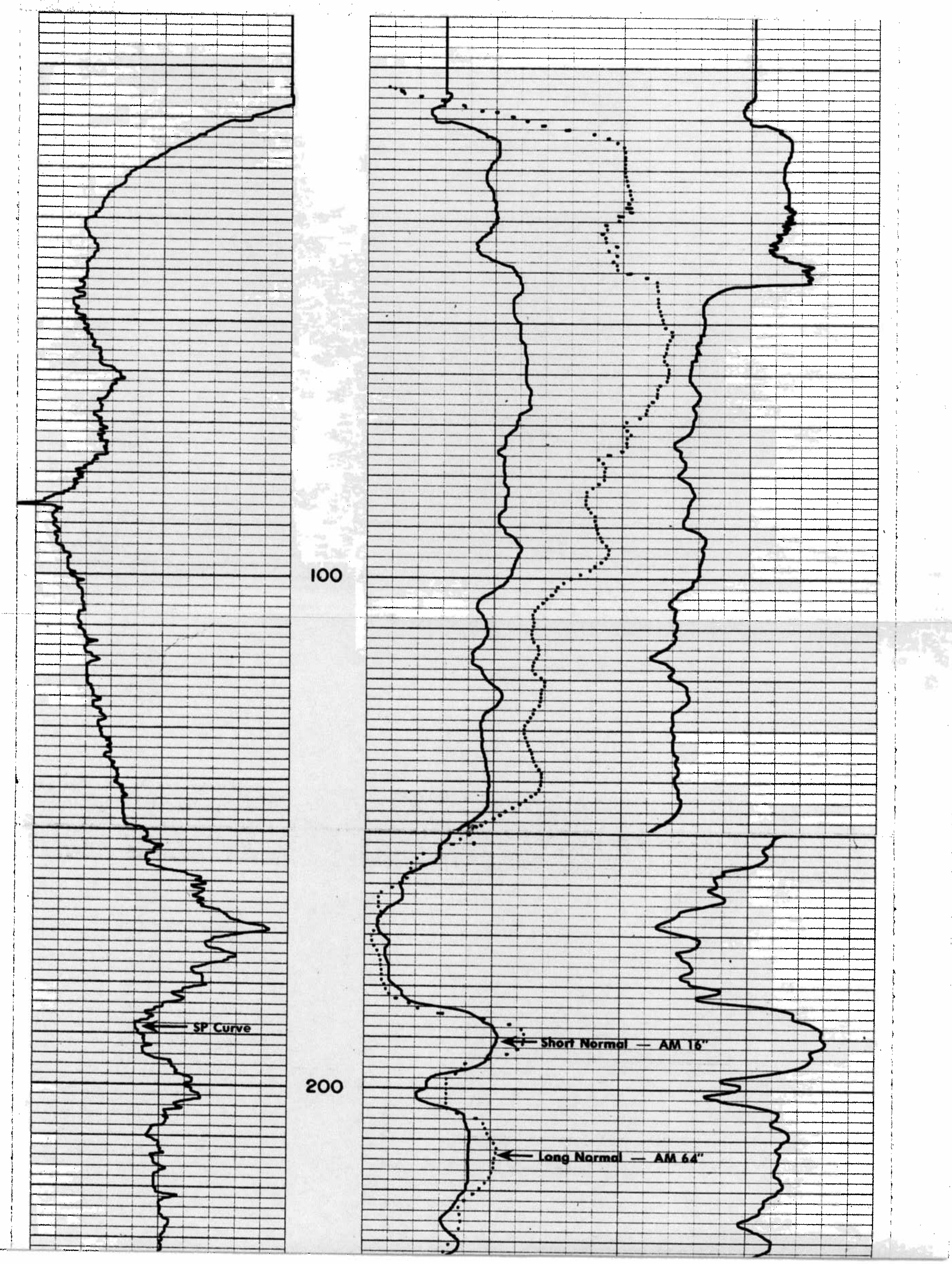
Equipment Data: Run No. ONE | Tool Type ELECTRIC LOG | Pad Type | Tool Position FREE | Other

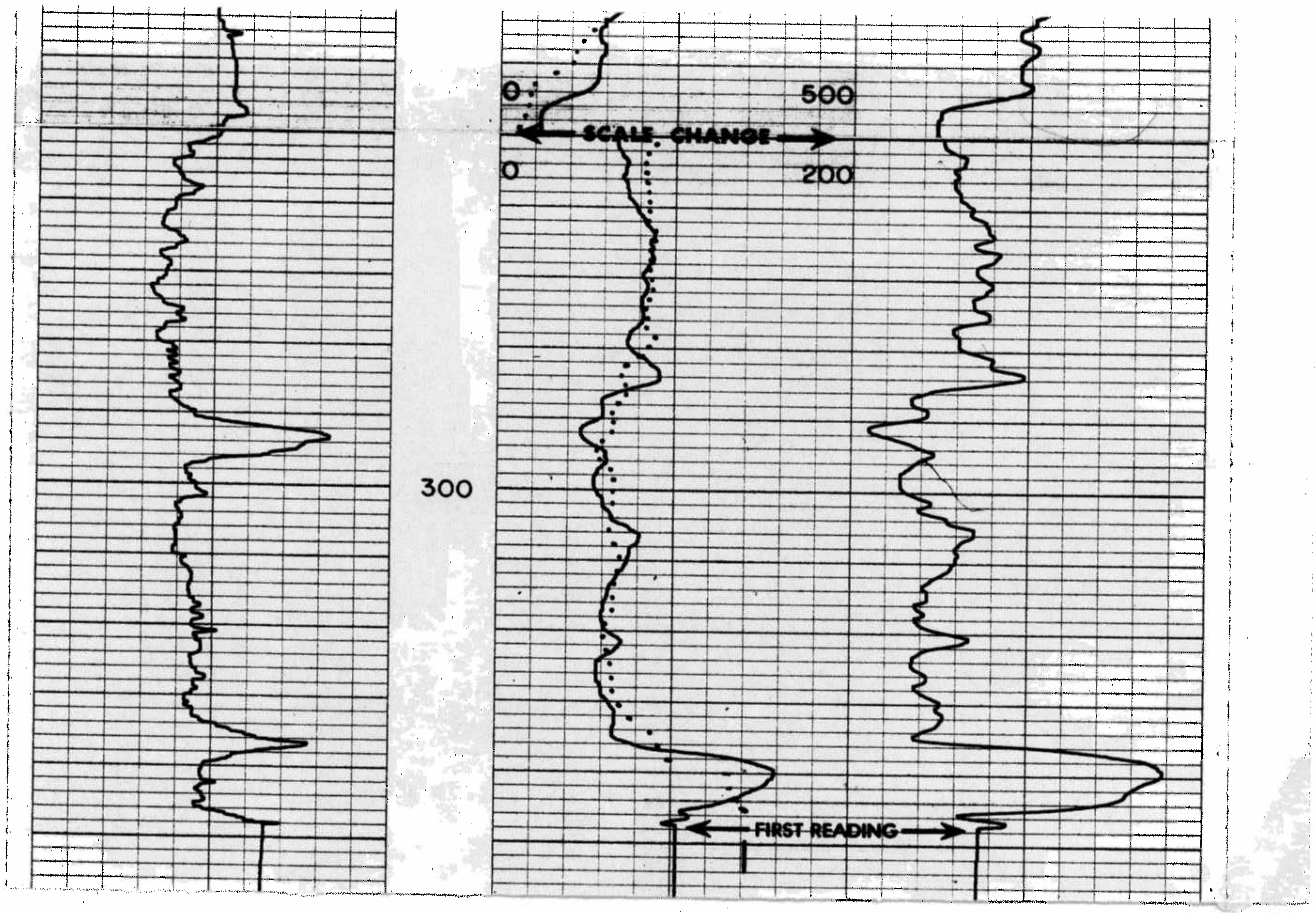
RESISTIVITY ohms. m²/m — RESISTANCE Detail Curve

RESISTIVITY ohms. m²/m — SHORT NORMAL 16 Inch 0 — 500; LONG NORMAL 64 Inch 0 — 500

Depths

SPONTANEOUS POTENTIAL millivolts — + 5 −


100
200
SP Curve
Short Normal — AM 16"
Long Normal — AM 64"


0
500
SCALE CHANGE
0
200
300
FIRST READING

APPENDIX C

WELL TEST DATA

WELL TEST DATA

Project No.: 58-7057

Date of Test: 12/17/97

Well No.: SECOND DOWNGRADIENT WELL

Static Water Level: 252.3 feet

Time	t	t'	t/t'	h	h'	Q	Remarks
	0			252.3			Turn on Pump
	0.5			252.3	0	200	CLEAR WATER
	1			252.3	0		
	2			253.5	1.2		
	3			253.5	1.2		
	4			253.5	1.2		
	5			253.5	1.2		
	6			253.5	1.2		
	7			253.5	1.2		
	8			253.5	1.2		
	9			253.5	1.2		
	10			253.5	1.2		
	16			253.5	1.2		
	22			253.5	1.2		
	30			253.5	1.2		
	35			253.5	1.2		
	40			253.5	1.2		
	45			253.5	1.2		
	50			253.5	1.2		
	55			253.5	1.2		
	60			253.5	1.2		T = 60°F
	70			253.5	1.2		
	80			253.5	1.2		
	90			253.5	1.2		
	100			253.5	1.2		clear water
	110			253.5	1.2		
	120			253.5	1.2		
	130			253.5	1.2	200	
	150			253.5	1.2		SHUT PUMP OFF

APPENDIX D

PERMEABILITY CALCULATIONS

LAW ENVIRONMENTAL, INC.
3420 NORTH SAN FERNANDO BLVD.
SUITE 200
BURBANK, CA 91504-2569
818-848-0214

JOB NO. 58-7057 SHEET 1 OF 1

JOB NAME

BY DATE

CHECKED BY DATE

$$T = \frac{1440\,Q}{\Delta S}$$

$\Delta S = 1.2$

$Q = 200$ g/min.

$T = (1440)(200/1.2') = 240{,}000$ gal/ft/day

$\div 7.48$ gal/cF $= 32{,}085$ ft²/day

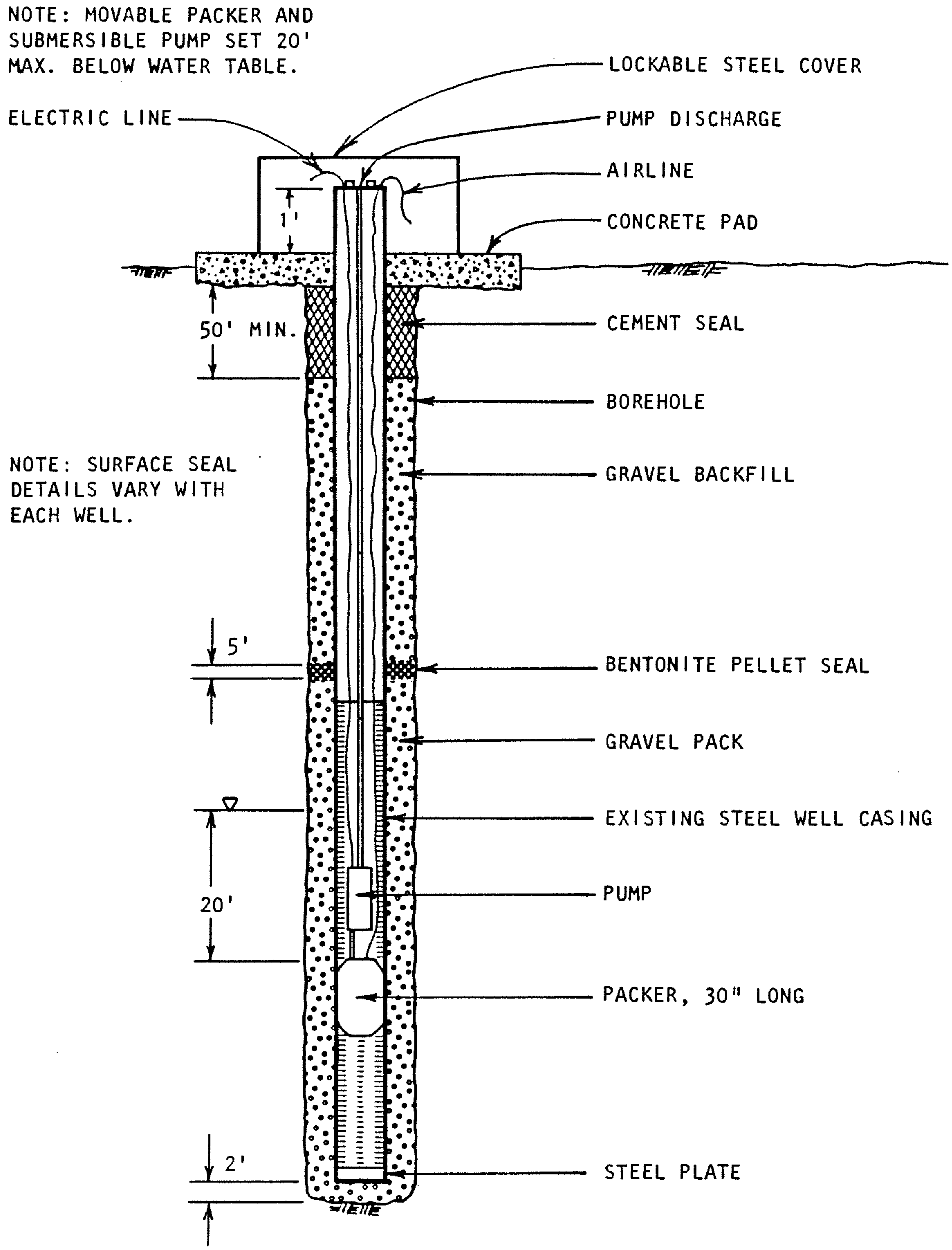
$$K = \frac{T}{b}$$

$b = 252.3 - 348 = 95.7$ say 100'

$K = 320.8$ ft/day

$$V = \frac{Ki}{S_y \approx .20} = 320 \times \frac{20}{4600} \Big/ .20 = 6.97 \text{ say } 7$$

ft/day



PROPOSED RETROFIT PACKER ASSEMBLY
FOR EXISTING WELLS AT HEWITT LANDFILL

NOT TO SCALE

LeROY CRANDALL AND ASSOCIATES

FIGURE 3

JOB E87057 58-7057 DATE ~~08-17-87~~ 09-17-87 DR. MA G. AC W.P. CHKD.

FORM 17

BROWN AND CALDWELL ANALYTICAL LABORATORIES

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

Corrected Report
12/17/84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
C -bonate Alk (as CO3), mg/L	0.0
. ,arbonate Alk (as HCO3), mg/L	300
Hydroxide Alk (as CaCO3), mg/L	0.0
Calcium (EDTA Titration), mg/L	11
Magnesium, mg/L	14
Chloride, mg/L	3.2
Copper, mg/L	<0.06
Surfactants, mg/L	<0.1
Iron, mg/L	<0.059
Manganese, mg/L	<0.032
pH, Units	7.8
Potassium, mg/L	3.5
Sodium, mg/L	34
Sulfate, mg/L	220
Specific Conductance, umhos/cm	830
Filterable Residue, mg/L	420
Zinc, mg/L	<0.013
Nitrate (as NO3), mg/L	15

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Purgeable Priority Pollutants	
~xtraction	11/19/84
.crolein, ug/L	<10
Acrylonitrile, ug/L	<10
Ethylbenzene, ug/L	3
Tetrachloroethylene, ug/L	3
Toluene, ug/L	8
Other Purgeable Priority Pollutants, ug/L	<1
Semi-Quantified Results **	
Xylene Isomers, ug/L	20

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard

Edward Wilson, Laboratory Director

GENERAL MINERAL ANALYSIS*

BROWN AND CALDWELL
CONSULTING ENGINEERS
ANALYTICAL SERVICES DIVISION
373 SOUTH FAIR OAKS AVE.
PASADENA, CA 91105
PHONE (213) 795-7553

Log No. P84-11-118-1

Date Sampled 11/08/84
Date Received 11/08/84
Date Reported 12/06/84

Reported To:
LeRoy Crandall
711 N. Alvarado Street
Los Angeles, CA 90026

Attn: Alice Campbell

cc.

Laboratory Director

Sample Description Hewitt Well #1

Anions	Miligrams per liter	Milliequiv. per liter	Determination	Milligrams per liter	Determination	Milligrams per liter
Nitrate Nitrogen (as NO_3)	15	0.24	Hydroxide Alkalinity (as $CaCO_3$)	0.0		
Chloride	22	0.63	Carbonate Alkalinity (as $CaCO_3$)	0.0		
Sulfate (as SO_4)	220	4.6	Bicarbonate Alkalinity (as $CaCO_3$)	250		
Bicarbonate (as HCO_3)	300	4.9	Calcium Hardness (as $CaCO_3$)	240		
Carbonate (as CO_3)	0.0	0.0	Magnesium Hardness (as $CaCO_3$)	60		
Total Milliequivalents per Liter		10	Total Hardness (as $CaCO_3$)	300		
Cations	**Milligrams per liter**	**Milliequiv. per liter**	Iron	< 0.059		
Sodium	34	1.5	Manganese	< 0.032		
Potassium	3.5	0.09	Copper	< 0.06		
Calcium	95	4.7	Zinc	< 0.013		
Magnesium	14	1.2	Foaming Agents (MBAS)	< 0.10		
Total Milliequivalents per Liter		7.5	Dissolved Residue, Evaporated @ 180°C	~~140,000~~[a] 400		
			Specific Conductance, micromhos @ 25°C	830	pH	7.8

*Conforms to Title 22, California Administrative Code (California Domestic Water Quality and Monitoring Regulations)

[a]Data rechecked and found to be true

LAW ENVIRONMENTAL, INC.

3420 NORTH SAN FERNANDO BLVD.
SUITE 200
BURBANK, CA 91504-2569
818-848-0214

JOB NO. 58-7057 SHEET 1 OF 2

JOB NAME Hewitt SWAT

BY SM DATE 6-4-88

CHECKED BY ______ DATE ______

WELL NO.	DATE	TDS	COD	TOC	TCE	PCE	DCA			Al	Ag	As	Cd	Cu	Fe	Hg	Mn	Pb	Ni	Se	Zn
(1) UPGRADIENT	4/4/88	320	4	<0.08	<1	2	<1			<0.2	<0.02	<0.002	<0.02	<0.02	1.2	<.0008	0.012	<0.002	<0.04	<0.004	0.17
	2/27/87	300	–	6	45	200	<1			–	–	–	–	<0.02	<0.02	–	0.050	–	–	–	<.03
	11/8/84	420	–	–	–	3	–			–	–	–	–	<0.06	<0.059	–	<0.032	–	–	–	<.013
(2) DOWN-GRADIENT 4909C	4/20/88	520	<3	0.16	<1	<1	<1			<0.2	<0.02	<0.002	<.0001	<0.02	1.3	<.0008	0.008	<0.002	<0.04	<0.02	0.03
	2/27/87	450	–	<3	71	6	<1			<0.2	<0.02	<0.002	<.0001	<0.02	<0.02	<.0008	0.009	<0.002	<0.04	<0.02	<0.03
	1/23/85	760	<3.0	–	2	6	–			–	–	–	–	<0.14	<0.13	–	<0.04	–	–	–	<.018
(3) SECOND DOWN-GRADIENT	4/4/88	570	<3	<0.08	<1	<1	<1			<0.2	<0.02	<0.002	<0.02	<0.02	0.90	<0.0008	0.050	<0.002	<0.04	<0.004	<0.03

Ca
NO_3
+
SO_4?

LAW ENVIRONMENTAL, INC.

3420 NORTH SAN FERNANDO BLVD.
SUITE 200
BURBANK, CA 91504-2569
818-848-0214

JOB NO. 58-~~8~~7057 SHEET 2 OF 2

JOB NAME HEWITT SWAT

BY SMF DATE 6-5-88

CHECKED BY ______ DATE ______

$C = 5/9(F-32)$
$F = 9/5C + 32.$

WELL NO	DATE	REF PT.	WATER ELEV.	TEMP °F	pH	EC	CO_2	ALK	EC (LAB)	pH (LAB)	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	NO_3	F	B
(1) UPGRADIENT	4/4/88			16.0°C ~~60.8~~	–	498	5/7	146/160	620	7.8	88	13	30	3	<0.6	290	50	27	21	0.2	0.39
	2/27/87			63.0	7.7	720	–	–	570	7.5	50	20	46	13	0	340	<1	16	0.6	–	–
	11/8/84								830	7.8	11	14	34	3.5	0	30	220	3.2	15		
(2) DOWN-GRADIENT 4909C	4/26/88			17°C ~~62.6~~	7.8	–	31/23	465/460	810	8.0	120	22	43	5.0	<0.6	520	32.5	16	1.4	0.3	0.35
	2/27/87			630	7.1	580	–	–	760	7.6	110	19	30	4.4	0	350	56	35	28	–	–
	1/23/85								810	7.2	75	28	33	5.0	–	450	28	17	–	–	–
(3) SECOND DOWN-GRADIENT	4/4/88			17½°C ~~63.5~~	7.5	750	15/16	364/415	960	7.5	130	24	50	6	<0.6	510	50	32	48	0.2	0.52

BC Log Number 88-04-054

CHAIN OF CUSTODY RECORD

Client name: LAW ~~ENGIN~~ ENVIRONMENTAL

Project or PO#: 58-7057

Address: 3420 SAN FERNANDO BLVD. SUITE 200

Phone #: 818 (~~294~~ 848-0214)

City, State, Zip: BURBANK CA

Report attention: ALICE CAMPBELL

Sampled by: STEVE McANDREW - Vince Richards

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	NO3	COD	TOX	GEN MIN + F + B	CAN MET + AL + Si	624/625	OIL + GREASE	Hazardous sample Special handling required	Remarks
1	4/1	2:00pm	GW	well #1 UPGRADIENT	1	X								
2	4/1			" "	1		X							
3	4/1			" "	1			X						
4				" "	1				X					
5				" "	1					X				
6				" "	4						X			
7				" "	2							X		
8				" "										
9														
10														

	Signature	Print Name	Company	Date	Time
Relinquished by	Vincent M. Richards	VINCENT M. Richards	LAW ENVIRONMENTAL	4/4/88	5:30pm
Received by	KRPatel	K.R. Patel	Brown and Caldwell Lab	4/4/88	5:30pm
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacifico [illegible], Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil O[illegible]ther PE—Petroleum

BC Log Number [illegible]

CHAIN OF CUSTODY RECORD

Client name: LAW ENVIRONMENTAL	Project or PO#: 58-7057
Address: 3420 N. SAN FERNANDO BLVD #200	Phone #: 818 848-0214
City, State, Zip:	Report attention: ALICE CAMBELL

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by / Sample description	Number of containers	COD	TOX	624/625	CAM METALS E+B	GEN MIN. AL+SI	OIL+GREASE	NO3	Hazardous sample Special handling required	Remarks
	4/26	3:30	GW	Hewitt 1st Downgradient - 4909C	9	X	X	X	X	X	X	X		

	Signature	Print Name	Company	Date	Time
Relinquished by	V. Richards	Vincent M. Richards	LAW ENVIRONMENTAL	4/26	4:23 p
Received by	S Milan	Susi Milan	B+C Labs	4/26/88	4:23 p
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacific[illegible] ue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CHAIN OF CUSTODY RECORD

BC Log Number 188-04-054

Client name: LAW ~~Engr~~ ENVIRONMENTAL

Project or PO#: 5B-7057

Address: 3420 San Fernando Blvd. Suite 200

Phone #: 818-818-0214

City, State, Zip: Burbank CA

Report attention: Alice Campbell

Sampled by:

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	NO3	COD	TOX	Gen Min F+B	CAM Met + Al+Si	624-625	Oil + Grease	Hazardous sample Special handling required	Remarks
1	4/1	1:00pm	GW	Well #3 2nd Downgradient	11	X	X	X	X	X	X	X		

	Signature	Print Name	Company	Date	Time
Relinquished by	Vincent M. Richards	Vincent M. Richards	LAW ENVIRONMENTAL	4/1/88	5:30pm
Received by	K.R. Patel	K. R. Patel	Brown and Caldwell Lab	4/1/88	5:30p
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BROWN AND CALDWELL LABORATORIES

☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300

☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553

☐ 1200 Pacifico A[illegible], Anaheim, CA 92805

Note:
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KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil O[illegible]her PE—Petroleum

BROWN AND CALDWELL
PASADENA, CALIFORNIA

PAGE 1

LABORATORY
ORDER

ORDER DATE 04 APR 88
PRINT DATE 04 APR 88 07:30PM

ORDER NO P88-04-054

REPORT TO: Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504
ATTN: Alice Campbell

DUE: 18 APR

LABORATORY ORDER
ACKNOWLEDGEMENT
CUSTOMER COPY

PHONE: 818/848-0214

INVOICE: Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504
ATTN: Accounts Payable

PROJECT: 58-7057
PHONE: 818/848-0214

SAMPLED BY: CLIENT   DELIVERED BY: CLIENT   DISPOSE AFTER 04 MAY

ITEM	LOG NUMBER	DESCRIPTION OF SAMPLE	SAMPLED DATE/TIME	RECEIVED	TYPE
1	04-054-1	Well #1 (upgradient)	04 APR	04 APR	GW
	04-054-2	Well #3 (2nd downgradient)	04 APR		

DETERMINATION	CODE	DEPT	QTY	PRICE	AMOUNT
Alkalinity	ALK	GE	2	1260.00	2520.00
Calcium (EDTA Titration)	CA,EDTA	GE			
Magnesium	MG	ME			
Chloride	CL	GE			
Copper	CU	ME			
Surfactants	MBAS	GE			
Iron	FE	ME			
Manganese	MN				
pH	PH	GE			
Potassium	K	ME			
Sodium	NA				
Sulfate	SO4	GE			
Specific Conductance	COND				
Filterable Residue (TDS)	TDS				
Zinc	ZN	ME			
Ion Balance	ION.BALANCE	GE			
Nitrate Nitrogen	NITRATE				
Nitric Acid Digestion	DIG,AQ	ME			
Boron	B	GE			
Chemical Oxygen Demand	COD				
Oil and Grease	O&G				
Fluoride	F				
Total Organic Halides (TOX)	TOX				
Aluminum	AL	ME			
Silicon	SI				
Antimony	SB				
Arsenic	AS				
Barium	BA				
Beryllium	BE				

LABORATORY ORDER CONTINUED ON PAGE 2

BROWN AND CALDWELL
PASADENA, CALIFORNIA

LABORATORY ORDER

ORDER NO P88-04-054

ORDER DATE 04 APR 88
PRINT DATE 04 APR 88 07:30PM

DUE: 18 APR

REPORT TO: Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504
ATTN: Alice Campbell

PHONE: 818/848-0214

INVOICE: Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504
ATTN: Accounts Payable

VW PROJECT: 58-7057
PHONE: 818/848-0214

SAMPLED BY: CLIENT

DELIVERED BY: CLIENT

DISPOSE AFTER 04 MAY

DETERMINATION	CODE	DEPT	QTY	PRICE	AMOUNT
Cadmium	CD				
Chromium	CR				
Cobalt	CO				
Lead	PB				
Mercury	HG				
Molybdenum	MO				
Nickel	NI				
Selenium	SE				
Silver	AG				
Thallium	TL				
Vanadium	V				
B/N,A Ext.Pri.Poll. (EPA-625)	625.HSL	MS			
Vol.Pri.Poll. (EPA-624)	624.HSL	MS			

INVOICE TO READ:

TOTAL AMOUNT DUE $2,520.0(
INVOICE: WITH REPOR:

CHAIN OF CUSTODY RECORD

BC Log Number P88- -054

Client name: LAW ~~EATEN~~ ENVIRONMENTAL

Project or PO#: 58-7057

Address: 3420 SAN Fernando BLVD · Suite 200

Phone #: 818 (~~244~~ 848·0214)

City, State, Zip: Burbank CA

Report attention: ALICE CAMBELL

Sampled by: Steve McAndle - Vince Richards

Analyses required

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	NO3	COD	TOX	GEN MIN+F+B	CAN MET+ AL+Si	624/625	OIL + GREASE	Hazardous sample Special handling required	Remarks
1	4/4	2:00pm	GW	well #1 UPGRADIENT	1	X								
2	4/4			" "	1		X							
3	4/4			" "	1			X						
4				" "	1				X					
5				" "	1					X				
6				" "	4						X			
7				" "	2							X		
8				" "										
9														
10														

	Signature	Print Name	Company	Date	Time
Relinquished by	Vincent M. Richards	VINCENT M. Richards	LAW ENVIRONMENTAL	4/4/88	5:30pm
Received by	KRPatel	K.R. Patel	Brown and Caldwell Lab	4/4/88	5:50pm
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

CHAIN OF CUSTODY RECORD

BC Log Number 188-1-054

Client name: LAW ~~EAST~~ ENVIRONMENTAL

Project or PO#: SB-7057

Address: 3420 SAN FERNANDO BLVD SUITE 200

Phone #: 818-818-0214

City, State, Zip: BURBANK CA

Report attention: ALICE CAMPBELL

Sampled by:

Analyses required: NO3, COD, TOX, GEN MIN FT B, CAT AN + ALK, C2U-C2S, OIL + GREASE, Hazardous sample, Special handling required

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description	Number of containers	NO3	COD	TOX	GEN MIN FT B	CAT AN + ALK	C2U-C2S	OIL + GREASE	Hazardous sample / Special handling required	Remarks
1	4/4	1:00pm	GW	Well #3 2nd DOWNGRADIENT	11	X	X	X	X	X	X	X		

	Signature	Print Name	Company	Date	Time
Relinquished by	Vincent M. Richmas	VINCENT M. RICHMAS	LAW ENVIRONMENTAL	4/4/88	5:30pm
Received by	K.K. Patel	K. K. Patel	Brown and Caldwell Lab	4/4/88	5:50pm
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BROWN AND CALDWELL LABORATORIES

- ☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
- ☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (818) 795-7553
- ☐ 1200 Pacifico Avenue, Anaheim, CA 92805

Note:
Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge GW—Groundwater SO—Soil OT—Other PE—Petroleum

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Boron, mg/L	0.39	0.52
Chemical Oxygen Demand, mg/L	4	<3
Oil and Grease, mg/L	<5	<5
Fluoride, mg/L	0.2	0.2
Total Organic Halides (TOX), mg/L	<0.08	<0.08
Aluminum, mg/L	<0.2	<0.2
Silicon, mg/L	9.3	10
Antimony, mg/L	<0.3	<0.3
Arsenic, mg/L	<0.002	<0.002
Barium, mg/L	0.13	0.25
Beryllium, mg/L	<0.001	<0.001
Cadmium, mg/L	<0.02	<0.02
Chromium, mg/L	<0.04	<0.04
Cobalt, mg/L	<0.04	<0.04
Lead, mg/L	<0.002	<0.002
Mercury, mg/L	<0.0008	<0.0008
Molybdenum, mg/L	<0.2	<0.2
Nickel, mg/L	<0.04	<0.04
Selenium, mg/L	<0.004	<0.004
Silver, mg/L	<0.02	<0.02
Thallium, mg/L	<0.2	<0.2
Vanadium, mg/L	<0.03	<0.03

BROWN AND CALDWELL LABORATORIES
373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
B/N,A Ext.Pri.Poll. (EPA-625)		
Date Extracted	04/09/88	04/09/88
Date Analyzed	04/18/88	04/18/88
Dilution Factor, Times 1	1	1
1,2,4-Trichlorobenzene, ug/L	<10	<10
1,2-Dichlorobenzene, ug/L	<10	<10
1,2-Diphenylhydrazine, ug/L	<10	<10
1,3-Dichlorobenzene, ug/L	<10	<10
1,4-Dichlorobenzene, ug/L	<10	<10
2,4,6-Trichlorophenol, ug/L	<10	<10
2,4-Dichlorophenol, ug/L	<10	<10
2,4-Dimethylphenol, ug/L	<10	<10
2,4-Dinitrotoluene, ug/L	<10	<10
2,4-Dinitrophenol, ug/L	<25	<25
2,6-Dinitrotoluene, ug/L	<10	<10
2-Chloronaphthalene, ug/L	<10	<10
2-Methylnaphthalene, ug/L	<10	<10
2-Methyl Phenol, ug/L	<10	<10
2-Nitrophenol, ug/L	<10	<10
2-Nitroaniline, ug/L	<50	<50
2,4,5-Trichlorophenol, ug/L	<10	<10
2-Chlorophenol, ug/L	<10	<10
2-Methyl-4,6-dintrophenol, ug/L	<50	<50
3,3'-Dichlorobenzidine, ug/L	<10	<10
3-Nitroaniline, ug/L	<50	<50
4-Bromophenylphenylether, ug/L	<10	<10

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 •(818) 795-7553 •FAX (818) 795-8579

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
4-Chloro-3-methylphenol, ug/L	<10	<10
4-Chlorophenylphenylether, ug/L	<10	<10
4-Chloroaniline, ug/L	<20	<20
4-Methyl Phenol, ug/L	<10	<10
4-Nitrophenol, ug/L	<25	<25
4-Nitroaniline, ug/L	<50	<50
Acenaphthene, ug/L	<10	<10
Acenaphthylene, ug/L	<10	<10
Aniline, ug/L	<20	<20
Anthracene, ug/L	<10	<10
Bis(2-ethylhexyl)phthalate, ug/L	<10	<10
Benzidine, ug/L	<40	<40
Benzoic Acid, ug/L	<50	<50
Benzyl Alcohol, ug/L	<20	<20
Bis(2-chloroethyl) Ether, ug/L	<10	<10
Bis(2-Chloroisopropyl)ether, ug/L	<10	<10
Bis(2-chloroethoxy)methane, ug/L	<10	<10
Benzo(a)anthracene, ug/L	<10	<10
Benzo(a)pyrene, ug/L	<10	<10
Benzo(b)fluoranthene, ug/L	<10	<10
Benzo(g,h,i)perylene, ug/L	<10	<10
Benzo(k)fluoranthene, ug/L	<10	<10
Butylbenzylphthalate, ug/L	<10	<10
Chrysene, ug/L	<10	<10
Di-n-octylphthalate, ug/L	<10	<10
Dibenzo(a,h)anthracene, ug/L	<10	<10

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Dibutylphthalate, ug/L	<50	<50
Diethylphthalate, ug/L	<10	<10
Dimethylphthalate, ug/L	<25	<25
Dibenzofuran, ug/L	<10	<10
Fluorene, ug/L	<10	<10
Fluoranthene, ug/L	<10	<10
Hexachlorobenzene, ug/L	<10	<10
Hexachlorobutadiene, ug/L	<10	<10
Hexachlorocyclopentadiene, ug/L	<10	<10
Hexachloroethane, ug/L	<10	<10
Indeno(1,2,3-c,d)Pyrene, ug/L	<10	<10
Isophorone, ug/L	<10	<10
N-Nitrosodi-n-propylamine, ug/L	<40	<40
N-Nitrosodimethylamine, ug/L	<80	<80
N-Nitrosodiphenylamine, ug/L	<10	<10
Naphthalene, ug/L	<10	<10
Nitrobenzene, ug/L	<10	<10
Pentachlorophenol, ug/L	<10	<10
Phenanthrene, ug/L	<10	<10
Phenol, ug/L	<10	<10
Pyrene, ug/L	<10	<10

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Vol.Pri.Poll. (EPA-624)		
Date Extracted	04/14/88	04/14/88
Dilution Factor, Times 1	1	1
1,1,1-Trichloroethane, ug/L	<1	<1
1,1,2,2-Tetrachloroethane, ug/L	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1
1,1-Dichloroethane, ug/L	<1	<1
1,1-Dichloroethylene, ug/L	<1	<1
1,2-Dichloroethane, ug/L	<1	<1
1,2-Dichlorobenzene, ug/L	<1	<1
1,2-Dichloropropane, ug/L	<1	<1
1,3-Dichlorobenzene, ug/L	<1	<1
cis-1,3-Dichloropropene, ug/L	<1	<1
1,4-Dichlorobenzene, ug/L	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1
2-Hexanone, ug/L	<1	<1
Acetone, ug/L	<10	<10
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Bromodichloromethane, ug/L	<1	<1
Bromomethane, ug/L	<1	<1
Benzene, ug/L	<1	<1
Chlorobenzene, ug/L	<1	<1
Carbon Tetrachloride, ug/L	<1	<1
Chloroethane, ug/L	<1	<1
Bromoform, ug/L	<1	<1

BROWN AND CALDWELL LABORATORIES

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-054-1	Well #1 (upgradient)	04 APR 88
04-054-2	Well #3 (2nd downgradient)	04 APR 88

PARAMETER	04-054-1	04-054-2
Chloroform, ug/L	7	<1
Chloromethane, ug/L	<1	<1
Carbon Disulfide, ug/L	<1	<1
Dibromochloromethane, ug/L	<1	<1
Ethylbenzene, ug/L	<1	<1
Freon 113, ug/L	<1	<1
Methyl Isobutyl Ketone, ug/L	<1	<1
Methyl Ethyl Ketone, ug/L	<10	<10
Methylene Chloride, ug/L	<1	<1
Tetrachloroethylene, ug/L	2	<1
Styrene, ug/L	<1	<1
Trichloroethylene, ug/L	<1	<1
Trichlorofluoromethane, ug/L	<1	<1
Toluene, ug/L	<1	<1
Vinyl Acetate, ug/L	<10	<10
Vinyl Chloride, ug/L	<1	<1
Total Xylene Isomers, ug/L	<10	<10
trans-1,2-Dichloroethylene, ug/L	<1	<1
trans-1,3-Dichloropropene, ug/L	<1	<1

BROWN AND CALDWELL LABORATORIES
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ANALYTICAL REPORT

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Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
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3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-054-1
Sample Description: Well #1 (upgradient)

General Mineral Analysis
Sampled Date 04 APR 88

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	21	0.34	Hydroxide Alk (as CaCO3)	<1
Chloride	27	0.76	Carbonate Alk (as CaCO3)	<1
Sulfate	50	1	Bicarb Alk (as CaCO3)	240
Bicarbonate (as HCO3)	290	4.8	Ca Hardness (as CaCO3)	220
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	53
			Total Hardness (as CaCO3)	273
Total Milliequivalents per Liter		6.9	Iron	1.2
			Manganese	0.012
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	0.17
Sodium	30	1.3	Surfactants (MBAS)	<0.1
Potassium	3	0.077	Filterable Residue (TDS)	320
Calcium (EDTA Titration)	88	4.4	Sp. Conductance, umhos/cm	620
Magnesium	13	1.1	pH, units	7.8
Total Milliequivalents per Liter		6.9		

* Conforms to Title 22, California Administrative Code

BROWN AND CALDWELL LABORATORIES
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ANALYTICAL REPORT

LOG NO: P88-04-054

Received: 04 APR 88
Reported: 21 APR 88

Alice Campbell
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3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-054-2
Sample Description: Well #3 (2nd downgradient)

General Mineral Analysis
Sampled Date 04 APR 88

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	48	0.77	Hydroxide Alk (as CaCO3)	<1
Chloride	32	0.9	Carbonate Alk (as CaCO3)	<1
Sulfate	50	1	Bicarb Alk (as CaCO3)	420
Bicarbonate (as HCO3)	510	8.4	Ca Hardness (as CaCO3)	320
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	99
			Total Hardness (as CaCO3)	419
Total Milliequivalents per Liter		11.1	Iron	0.90
			Manganese	0.005
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	0.06
Sodium	50	2.2	Surfactants (MBAS)	<0.1
Potassium	6	0.15	Filterable Residue (TDS)	570
Calcium (EDTA Titration)	130	6.5	Sp. Conductance, umhos/cm	960
Magnesium	24	2	pH, units	7.5
Total Milliequivalents per Liter		10.9		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

BROWN AND CALDWELL LABORATORIES
373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 • (818) 795-7553 • FAX (818) 795-8579

ANALYTICAL REPORT

LOG NO: P88-04-554

Received: 26 APR 88
Reported: 17 MAY 88

Alice Campbell
Law Environmental
3420 N. San Fernando Rd., Suite 200
Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Chemical Oxygen Demand, mg/L	<3
Non-filterable Residue (TSS), mg/L	<5
Oil and Grease, mg/L	<5
Volatile Suspended Solids, mg/L	<5
Fluoride, mg/L	0.3
Total Organic Halides (TOX), mg/L	0.16
Aluminum, mg/L	<0.2
Boron, mg/L	0.35
Antimony, mg/L	<0.3
Arsenic, mg/L	<0.002
Barium, mg/L	0.23
Beryllium, mg/L	<0.001
Cadmium, mg/L	<0.0001
Chromium, mg/L	<0.04
Cobalt, mg/L	<0.04
Lead, mg/L	<0.002
Mercury, mg/L	<0.0008
Molybdenum, mg/L	<0.2
Nickel, mg/L	<0.04
Selenium, mg/L	<0.02
Silver, mg/L	<0.02
Thallium, mg/L	<0.2
Vanadium, mg/L	<0.03

BROWN AND CALDWELL LABORATORIES
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ANALYTICAL REPORT

LOG NO: P88-04-554

Received: 26 APR 88
Reported: 17 MAY 88

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Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
B/N,A Ext.Pri.Poll. (EPA-625)	
Date Extracted	04/29/88
Date Analyzed	05/13/88
Dilution Factor, Times 1	1
1,2,4-Trichlorobenzene, ug/L	<10
1,2-Dichlorobenzene, ug/L	<10
1,2-Diphenylhydrazine, ug/L	<10
1,3-Dichlorobenzene, ug/L	<10
1,4-Dichlorobenzene, ug/L	<10
2,4,6-Trichlorophenol, ug/L	<10
2,4-Dichlorophenol, ug/L	<10
2,4-Dimethylphenol, ug/L	<10
2,4-Dinitrotoluene, ug/L	<10
2,4-Dinitrophenol, ug/L	<25
2,6-Dinitrotoluene, ug/L	<10
2-Chloronaphthalene, ug/L	<10
2-Methylnaphthalene, ug/L	<10
2-Methyl Phenol, ug/L	<10
2-Nitrophenol, ug/L	<10
2-Nitroaniline, ug/L	<50
2,4,5-Trichlorophenol, ug/L	<10
2-Chlorophenol, ug/L	<10
2-Methyl-4,6-dintrophenol, ug/L	<50
3,3'-Dichlorobenzidine, ug/L	<10
3-Nitroaniline, ug/L	<50
4-Bromophenylphenylether, ug/L	<10
4-Chloro-3-methylphenol, ug/L	<10

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Reported: 17 MAY 88

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
4-Chlorophenylphenylether, ug/L	<10
4-Chloroaniline, ug/L	<20
4-Methyl Phenol, ug/L	<10
4-Nitrophenol, ug/L	<25
4-Nitroaniline, ug/L	<50
Acenaphthene, ug/L	<10
Acenaphthylene, ug/L	<10
Aniline, ug/L	<20
Anthracene, ug/L	<10
Bis(2-ethylhexyl)phthalate, ug/L	<10
Benzidine, ug/L	<40
Benzoic Acid, ug/L	<50
Benzyl Alcohol, ug/L	<20
Bis(2-chloroethyl) Ether, ug/L	<10
Bis(2-Chloroisopropyl)ether, ug/L	<10
Bis(2-chloroethoxy)methane, ug/L	<10
Benzo(a)anthracene, ug/L	<10
Benzo(a)pyrene, ug/L	<10
Benzo(b)fluoranthene, ug/L	<10
Benzo(g,h,i)perylene, ug/L	<10
Benzo(k)fluoranthene, ug/L	<10
Butylbenzylphthalate, ug/L	<10
Chrysene, ug/L	<10
Di-n-octylphthalate, ug/L	<10
Dibenzo(a,h)anthracene, ug/L	<10
Dibutylphthalate, ug/L	<50
Diethylphthalate, ug/L	<10

BROWN AND CALDWELL LABORATORIES

ANALYTICAL REPORT

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LOG NO: P88-04-554

Received: 26 APR 88
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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Dimethylphthalate, ug/L	<25
Dibenzofuran, ug/L	<10
Fluorene, ug/L	<10
Fluoranthene, ug/L	<10
Hexachlorobenzene, ug/L	<10
Hexachlorobutadiene, ug/L	<10
Hexachlorocyclopentadiene, ug/L	<10
Hexachloroethane, ug/L	<10
Indeno(1,2,3-c,d)Pyrene, ug/L	<10
Isophorone, ug/L	<10
N-Nitrosodi-n-propylamine, ug/L	<40
N-Nitrosodimethylamine, ug/L	<80
N-Nitrosodiphenylamine, ug/L	<10
Naphthalene, ug/L	<10
Nitrobenzene, ug/L	<10
Pentachlorophenol, ug/L	<10
Phenanthrene, ug/L	<10
Phenol, ug/L	<10
Pyrene, ug/L	<10

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Vol.Pri.Poll. (EPA-624)	
Date Extracted	05/05/88
Dilution Factor, Times 1	1
1,1,1-Trichloroethane, ug/L	<1
1,1,2,2-Tetrachloroethane, ug/L	<1
1,1,2-Trichloroethane, ug/L	<1
1,1-Dichloroethane, ug/L	<1
1,1-Dichloroethylene, ug/L	<1
1,2-Dichloroethane, ug/L	<1
1,2-Dichlorobenzene, ug/L	<1
1,2-Dichloropropane, ug/L	<1
1,3-Dichlorobenzene, ug/L	<1
cis-1,3-Dichloropropene, ug/L	<1
1,4-Dichlorobenzene, ug/L	<1
2-Chloroethylvinylether, ug/L	<1
2-Hexanone, ug/L	<1
Acetone, ug/L	<10
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Bromodichloromethane, ug/L	<1
Bromomethane, ug/L	<1
Benzene, ug/L	<1
Chlorobenzene, ug/L	<1
Carbon Tetrachloride, ug/L	<1
Chloroethane, ug/L	<1
Bromoform, ug/L	<1
Chloroform, ug/L	<1

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Project: 58-7057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
04-554-1	Hewitt 1st Down gradients--4909C	26 APR 88

PARAMETER	04-554-1
Chloromethane, ug/L	<1
Carbon Disulfide, ug/L	<1
Dibromochloromethane, ug/L	<1
Ethylbenzene, ug/L	<1
Freon 113, ug/L	<1
Methyl Isobutyl Ketone, ug/L	<1
Methyl Ethyl Ketone, ug/L	<10
Methylene Chloride, ug/L	<1
Tetrachloroethylene, ug/L	<1
Styrene, ug/L	<1
Trichloroethylene, ug/L	<1
Trichlorofluoromethane, ug/L	<1
Toluene, ug/L	<1
Vinyl Acetate, ug/L	<10
Vinyl Chloride, ug/L	<1
Total Xylene Isomers, ug/L	<10
trans-1,2-Dichloroethylene, ug/L	<1
trans-1,3-Dichloropropene, ug/L	<1

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ANALYTICAL REPORT

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Received: 26 APR 88
Reported: 17 MAY 88

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Burbank, CA 91504

Project: 58-7057

REPORT OF ANALYTICAL RESULTS

Log Number : 88-04-554-1
Sample Description: Hewitt 1st Down gradients--4909C

General Mineral Analysis
Sampled Date 26 APR 88

Anions	mg/L	meq/L	Determination	mg/L
Nitrate* (as NO3)	1.4	0.023	Hydroxide Alk (as CaCO3)	<1
Chloride	16	0.45	Carbonate Alk (as CaCO3)	<1
Sulfate	32.5	0.677	Bicarb Alk (as CaCO3)	430
Bicarbonate (as HCO3)	520	8.6	Ca Hardness (as CaCO3)	300
Carbonate (as CO3)	<0.6	<0.02	Mg Hardness (as CaCO3)	90
			Total Hardness (as CaCO3)	390
Total Milliequivalents per Liter		9.8	Iron	1.3
			Manganese	0.008
Cations	**mg/L**	**meq/L**	Copper	<0.02
			Zinc	0.03
Sodium	43	1.9	Surfactants (MBAS)	<0.1
Potassium	5.0	0.13	Filterable Residue (TDS)	520
Calcium (EDTA Titration)	120	6	Sp. Conductance, umhos/cm	810
Magnesium	22	1.8	pH, units	8.00
Total Milliequivalents per Liter		9.8		

* Conforms to Title 22, California Administrative Code

Jeffrey A. Erion, Laboratory Director

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1 Well Upgradient Hewitt	27 FEB 87
02-486-2	Sample #2 Well 4909C	27 FEB 87

PARAMETER	02-486-1	02-486-2
Total Organic Carbon (TOC), mg/L	6	<3
Dissolved Digestion, Date	03/02/87	03/02/87

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Vol.Pri.Poll. (EPA-624)		
Extraction	03/13/87	03/13/87
Dilution Factor, Times 1	1	1
1,1,1-Trichloroethane, ug/L	9	4
1,1,2,2-Tetrachloroethane, ug/L	<1	<1
1,1,2-Trichloroethane, ug/L	<1	<1
1,1-Dichloroethane, ug/L	46	<1
1,1-Dichloroethylene, ug/L	10	<1
1,2-Dichloroethane, ug/L	<1	<1
1,2-Dichloropropane, ug/L	9	<1
1,3-Dichloropropene, ug/L	<1	<1
2-Chloroethylvinylether, ug/L	<1	<1
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Bromodichloromethane, ug/L	<1	<1
Bromomethane, ug/L	<1	<1
Benzene, ug/L	<1	<1
Chlorobenzene, ug/L	<1	<1
Carbon Tetrachloride, ug/L	<1	<1
Chloroethane, ug/L	<1	<1
Bromoform, ug/L	<1	<1
Chloroform, ug/L	6	<1
Chloromethane, ug/L	<1	<1
Dibromochloromethane, ug/L	<1	<1
Ethylbenzene, ug/L	<1	<1
Methylene Chloride, ug/L	2	<1

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
02-486-1	Sample #1	27 FEB 87
02-486-2	Sample #2	27 FEB 87

PARAMETER	02-486-1	02-486-2
Tetrachloroethylene, ug/L	200	6
Trichloroethylene, ug/L	45	71
Trichlorofluoromethane, ug/L	<1	<1
Toluene, ug/L	<1	<1
Vinyl Chloride, ug/L	<1	<1
trans-1,2-Dichloroethylene, ug/L	21	<1
trans-1,3-Dichloropropene, ug/L	<1	<1
Other Vol.Pri.Poll. (EPA-624)	---	---
Semi-Quantified Results **		
Dichlorofluoromethane, ug/L	70	---

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-1
Sample Description: Sample #1

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	0.6	0.0097	Hydroxide Alk (as CaCO3)	0.0
Chloride	16	0.45	Carbonate Alk (as CaCO3)	0.0
Sulfate	<1	<0.021	Bicarb Alk (as CaCO3)	280
Bicarbonate (as HCO3)	340	5.6	Ca Hardness (as CaCO3)	120
Carbonate (as CO3)	0	0	Mg Hardness (as CaCO3)	82
			Total Hardness (as CaCO3)	202
Total Milliequivalents per Liter		6.1	Iron	<0.02
			Manganese	0.050
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	<0.03
Sodium	46	2	Surfactants	<0.1
Potassium	13	0.33	Filterable Residue (TDS)	300
Calcium (EDTA Titration)	50	2.5	Sp. Conductance, umhos/cm	570
Magnesium	20	1.6	pH, units	7.5
Total Milliequivalents per Liter		6.4		

* Conforms to Title 22, California Administrative Code

LOG NO: P87-02-486

Received: 27 FEB 87
Reported: 17 MAR 87

Alice Campbell
LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009

Project: E-87057

REPORT OF ANALYTICAL RESULTS

Log Number : 87-02-486-2
Sample Description: Sample #2

General Mineral Analysis
Sampled Date 27 FEB 87

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	28	0.45	Hydroxide Alk (as CaCO3)	0.0
Chloride	35	0.99	Carbonate Alk (as CaCO3)	0.0
Sulfate	56	1.2	Bicarb Alk (as CaCO3)	290
Bicarbonate (as HCO3)	350	5.8	Ca Hardness (as CaCO3)	270
Carbonate (as CO3)	0	0	Mg Hardness (as CaCO3)	78
			Total Hardness (as CaCO3)	348
Total Milliequivalents per Liter		8.4	Iron	<0.02
			Manganese	0.009
Cations	mg/L	meq/L	Copper	<0.02
			Zinc	<0.03
Sodium	30	1.3	Surfactants	0.0
Potassium	4.4	0.11	Filterable Residue (TDS)	450
Calcium (EDTA Titration)	110	5.5	Sp. Conductance, umhos/cm	760
Magnesium	19	1.6	pH, units	7.6
Total Milliequivalents per Liter		8.5		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS WQ. # 12002

Date Received: 1/23/84 (Leave Blank)
Lab. No. 14062
System Number:
Serial Number: C 22426

Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT

Sampling Point: NEW WELL #2 - EAST (WTP)

Collected by: KAMSTEDT
Date and Hour Collected: 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☒ Other Obs Well.

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☒ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS (mg/l as Ca CO_3): ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☒ Other analyses desired (specify):

VOA

1,1 dichloroethane = 0.55 ug/l
(c) 1,2 dichloroethylene = 0.87 ug/l
chloroform = 1.0 ug/l
trichloroethylene = 1.1 ug/l
Perchloroethylene = 2.9 ug/l
p-dichlorobenzene = 2.7 ug/l

Date Reported: 1-24-85
Analyst: P.H.

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4 ☐ Spec. Cond. µ mhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS WQ # 12002

Date Received: 1/23/84 (Leave Blank)
Lab. No. 14063
System Number:
Serial Number: C 22430

Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT

Sampling Point: NEW WELL #2 - EAST (WTP)

Collected by: KAMSTEDT
Date and Hour Collected: 1-23-85 1030

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☒ Other Trip Blank

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☒ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS (mg/l as Ca CO_3): ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☒ Other analyses desired (specify):

VOA

Chloropropene isomer

Date Reported: 1-24-85
Analyst: P.H.

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4 ☐ Spec. Cond. µ mhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O. #12002

Date Received: 1/23/85 (Leave Blank)
Lab. No. 14064

Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT

System Number:

Serial Number: C 22427

Sampling Point: NEW WELL #2 - EAST (WTP)

Collected by: RAMSTEDT

Date and Hour Collected: 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS (mg/l as Ca CO3): ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):

BNA

None detected.

Date Reported: 1-28-85
Analyst: P.H.

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4
☐ Spec. Cond. µ mhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.O. # 12002

Date Received: 1/23/85 (Leave Blank)
Lab. No. 14066

Purveyor and Address (include city and county): VALLEY RECLAMATION - HEWITT PIT

System Number:

Serial Number: C 22428

Sampling Point: NEW WELL - EAST (WTP)

Collected by: RAMSTEDT

Date and Hour Collected: 1-23-85 1208

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☑ ~~GENERAL MINERAL ANALYSIS~~ (mg/l as Ca CO3): ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS:

Element	Result
☐ Al	
☑ Ag	< 0.001
☑ As	< 0.01
☐ B	
☑ Cd	< 0.001
☑ Cr	< 0.01
☑ Cu	< 0.01
☑ Hg	< 0.001
☑ Pb	< 0.01
☑ Ni	< 0.01
☑ Se	< 0.01
☑ Zn	< 0.01

☑ Other analyses desired (specify):

(HM)

Sb — < 0.01 mg/l
Be — < 0.001 mg/l
Tl — < 0.01 mg/l
Cr+6 = < .001 ug/ml

Date Reported: 2-6-85
Analyst: NP CL ST

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4
☐ Spec. Cond. µ mhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

State of California · Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS W.Q # 12002

Date Received 1/23/85 (Leave Blank)

Lab. No. 14065

Purveyor and Address (include city and county) VALLEY RECLAMATION - HEWITT PIT

System Number

Serial Number C 22429

Sampling Point NEW WELL - EAST (W+P)

Collected by RAMSTEDT

Date and Hour Collected 1-23-85 1200

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☒ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☒ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☒ GENERAL MINERAL ANALYSIS

			(mg/l as $CaCO_3$)
☐ Ca	128.	☐ Hardness	445.
☐ Mg	31.	☐ HCO_3	492.
☐ Fe Total	0.6	☐ CO_3	0.
☐ Mn	<0.02	☐ OH	0.
☐ Na	41.	☐ Total Alk.	492.
☐ K	4.7	☐ Cl	18.
☐ pH	7.6	☐ SO_4	27.
☐ Total Dissolved Solids	569	☐ F	0.29
		☐ NO_3	4.9

TRACE ELEMENTS

☐ Al
☐ Ag
☐ As
☐ B
☐ Cd
☐ Cr
☐ Cu
☐ Hg
☐ Pb
☐ Ni
☐ Se
☐ Zn
☐

☒ Other analyses desired (specify):

COD - 2.4 mg/L

CN - <0.001 mg/L

Phenol - <0.001 ug/ml

Date Reported 2-4-85

Analyst MO RSUT ML

☐ Turb. TU	☐ NH_3-N	☐ BOD	☐ Susp. Solids	☐ PO_4
☐ Spec. Cond. µmhos/cm	☐ ORG-N	☐ Grease	☐ Set Solids ml/l/hour	☐ MBAS

Form LAB-800 (2-80)

O. J. ROGERS
FEB 14 1984

WATER QUALITY DIVISION
REPORT OF WATER ANALYSIS
(Chemical Resul . in mg/litre)

Samp' 'o	Date Taken	Date Rec'd	Collector	Description
R-464	1-30-84	1-31-84	CT/DPG	Janss Well
465	"	"	"	McBride Well

	Sample No.	Date Anal	R-464	Date Anal	465	Date Anal		Date Anal		Date Anal		Date Anal	
✓	Conductivity, μmhos/cm		420		766								
	pH Field												
✓	pH Lab.	1/31 PB	6.81	1/31 PB	7.29								
	Temperature °C, Field		15.5		16.5								
✓	Temperature °C, Lab.	1/31 PB	18.4	1/31 PB	18.1								
✓	Calcium (Ca)		45		96								
✓	Magnesium (Mg)		16		12								
✓	Total Hardness as $CaCO_3$		176		290								
✓	Sodium (Na)	1/31	16	CW	42								
✓	Potassium (K)	CW	2.7		4.8								
	Alkalinity as $CaCO_3$, Field		163		340								
✓	Alkalinity as $CaCO_3$, Lab.		158		340								
✓	Sulfate (SO_4)	2-1 BJ	24.	2-1 BJ	31								
✓	Chloride (Cl)		16		16								
✓	Nitrate (N)	2-2 BJ	<0.02	2-2 BJ	0.28								
✓	Arsenic (As)	2/9 CW	<.01	CW	<.01								
✓	Silica (SiO_2)	2-1	40	2-1	26								
✓	Iron (Fe)	1/31 CW	<.01	1/31 CW	<.01								
✓	Boron (B)	1-31 BJ	0.43	1-31 BJ	0.49								
✓	Phosphate (P)	1-31 BJ	0.04	1-31 BJ	0.03								
✓	Surfactants (MBAS)	2-1	<.05	2-8	<.05								
✓	Fluoride (F)	2-3 BT	0.32	2-3 BJ	0.26								
✓	Ammonia (N)	1/31 PB	0.072		<0.001								
✓	Total Kjeldahl Nitrogen (N)	2/1 PB	0.24		0.06								
✓	Nitrite (N)	1/31 PB	<0.001		<0.001								
	Dissolved Oxygen, Field		1.5		7.2								
✓	Dissolved Oxygen, Lab.	1/31 PB	8.50*		8.4								
✓	BOD		2.6		8.3								
✓	Color (Apparent) Units	1/31 PB	35	1/31 PB	2								
✓	Turbidity JT Units		9.6		0.2								
✓	Odor (Threshold)		M1.0		<1.0								
✓	TDS	1-31 BJ	278	1-31 BJ	502								

R. [illegible] UMOTO
FEB 14 198[illegible]

REMARKS: Results to D. Goodrea *aerated

FORM 235 - Rev 3/83 WS189

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
1,1,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	6
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as CaCO3), mg/L	0.0
Bicarbonate (as CaCO3), mg/L	450
Hydroxide Alk (as CaCO3), mg/L	0.0
Total Alkalinity (as CaCO3), mg/L	450
Calcium (EDTA Titration), mg/L	75
Magnesium, mg/L	28
Chloride, mg/L	17
Copper, mg/L	<0.14
Surfactants, mg/L	<0.10

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 (818) 795-7553 (213) 681-4655

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Iron, mg/L	<0.13
Manganese, mg/L	<0.04
p Units	7.2
Potassium, mg/L	5.0
Sodium, mg/L	33
Sulfate, mg/L	28
Specific Conductance, umhos/cm	810
Filterable Residue, mg/L	760
Zinc, mg/L	<0.018
Nitrate (as NO3), mg/L	7.5
Nitric Acid Digestion, Date	01/29/85
Chemical Oxygen Demand, mg/L	<3.0

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	7.5	0.1	Hydroxide Alk (as CaCO3)	0.0
Chloride	17	0.5	Carbonate Alk (as CaCO3)	0
Sulfate	28	0.6	Bicarbonate Alk(as CaCO3)	367
Bicarbonate (as CaCO3)	450	7.3	Ca Hardness (as CaCO3)	187
Carbonate Alk (as CaCO3)	0.0	0.0	Mg Hardness (as CaCO3)	115
			Total Hardness	302
Total Millequivalents per Liter		8.5	Iron	<0.13
			Manganese	<0.04
Cations	mg/L	meq/L	Copper	<0.14
			Zinc	<0.018
Sodium	33	1.4	Surfactants	<0.10
Potassium	5.0	0.1	Filterable Residue	760
Calcium (EDTA Titration)	75	3.7	Sp. Conductance, umhos/cm	810
Magnesium	28	2.3	pH, units	7.2
Total Millequivalents per Liter		7.6		

* Conforms to Title 22, California Administrative Code

Edward Wilson

Edward Wilson, Laboratory Director

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
1,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	6
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as CaCO3), mg/L	0.0
Bicarbonate (as CaCO3), mg/L	450
Hydroxide Alk (as CaCO3), mg/L	0.0
Total Alkalinity (as CaCO3), mg/L	450
Calcium (EDTA Titration), mg/L	75
Magnesium, mg/L	28
Chloride, mg/L	17
Copper, mg/L	<0.14
Surfactants, mg/L	<0.10

373 SOUTH FAIR OAKS AVENUE PASADENA, CA 91105 (818) 795-7553 (213) 681-4655

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Iron, mg/L	<0.13
Manganese, mg/L	<0.04
pH Units	7.2
Potassium, mg/L	5.0
Sodium, mg/L	33
Sulfate, mg/L	28
Specific Conductance, umhos/cm	810
Filterable Residue, mg/L	760
Zinc, mg/L	<0.018
Nitrate (as NO3), mg/L	7.5
Nitric Acid Digestion, Date	01/29/85
Chemical Oxygen Demand, mg/L	<3.0

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	7.5	0.1	Hydroxide Alk (as CaCO3)	0.0
Chloride	17	0.5	Carbonate Alk (as CaCO3)	0
Sulfate	28	0.6	Bicarbonate Alk(as CaCO3)	367
Bicarbonate (as CaCO3)	450	7.3	Ca Hardness (as CaCO3)	187
Carbonate Alk (as CaCO3)	0.0	0.0	Mg Hardness (as CaCO3)	115
			Total Hardness	302
Total Millequivalents per Liter		8.5	Iron	<0.13
			Manganese	<0.04
Cations	mg/L	meq/L	Copper	<0.14
			Zinc	<0.018
Sodium	33	1.4	Surfactants	<0.10
Potassium	5.0	0.1	Filterable Residue	760
Calcium (EDTA Titration)	75	3.7	Sp. Conductance, umhos/cm	810
Magnesium	28	2.3	pH, units	7.2
Total Millequivalents per Liter		7.6		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
.,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	6
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as $CaCO_3$), mg/L	0.0
Bicarbonate (as $CaCO_3$), mg/L	450
Hydroxide Alk (as $CaCO_3$), mg/L	0.0
Total Alkalinity (as $CaCO_3$), mg/L	450
Calcium (EDTA Titration), mg/L	75
Magnesium, mg/L	28
Chloride, mg/L	17
Copper, mg/L	<0.14
Surfactants, mg/L	<0.10

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Iron, mg/L	<0.13
Manganese, mg/L	<0.04
p Units	7.2
Potassium, mg/L	5.0
Sodium, mg/L	33
Sulfate, mg/L	28
Specific Conductance, umhos/cm	810
Filterable Residue, mg/L	760
Zinc, mg/L	<0.018
Nitrate (as NO3), mg/L	7.5
Nitric Acid Digestion, Date	01/29/85
Chemical Oxygen Demand, mg/L	<3.0

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	7.5	0.1	Hydroxide Alk (as CaCO3)	0.0
Chloride	17	0.5	Carbonate Alk (as CaCO3)	0
Sulfate	28	0.6	Bicarbonate Alk(as CaCO3)	367
Bicarbonate (as CaCO3)	450	7.3	Ca Hardness (as CaCO3)	187
Carbonate Alk (as CaCO3)	0.0	0.0	Mg Hardness (as CaCO3)	115
			Total Hardness	302
Total Millequivalents per Liter		8.5	Iron	<0.13
			Manganese	<0.04
Cations	mg/L	meq/L	Copper	<0.14
			Zinc	<0.018
Sodium	33	1.4	Surfactants	<0.10
Potassium	5.0	0.1	Filterable Residue	760
Calcium (EDTA Titration)	75	3.7	Sp. Conductance, umhos/cm	810
Magnesium	28	2.3	pH, units	7.2
Total Millequivalents per Liter		7.6		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

BROWN AND CALDWELL ANALYTICAL LABORATORIES

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

Corrected Report

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Purgeable Priority Pollutants	
Extraction	01/25/85
1,1,1-Trichloroethane, ug/L	3
1,1-Dichloroethane, ug/L	1
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Chloroform, ug/L	2
Tetrachloroethylene, ug/L	6
Trichloroethylene, ug/L	2
trans-1,2-Dichloroethylene, ug/L	1
Other Purgeable Priority Pollutants,	<1
Alkalinity	
Carbonate Alk (as $CaCO_3$), mg/L	0.0
Bicarbonate (as $CaCO_3$), mg/L	450
Hydroxide Alk (as $CaCO_3$), mg/L	0.0
Total Alkalinity (as $CaCO_3$), mg/L	450
Calcium (EDTA Titration), mg/L	75
Magnesium, mg/L	28
Chloride, mg/L	17
Copper, mg/L	<0.14
Surfactants, mg/L	<0.10

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
01-250-1	LADWP HEWITT WELL	23 JAN 85

PARAMETER	01-250-1
Iron, mg/L	<0.13
Ma--anese, mg/L	<0.04
pL Jnits	7.2
Potassium, mg/L	5.0
Sodium, mg/L	33
Sulfate, mg/L	28
Specific Conductance, umhos/cm	810
Filterable Residue, mg/L	760
Zinc, mg/L	<0.018
Nitrate (as NO3), mg/L	7.5
Nitric Acid Digestion, Date	01/29/85
Chemical Oxygen Demand, mg/L	<3.0

LOG NO: P85-01-250

Received: 23 JAN 85
Reported: 07 FEB 85

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Alice Campbell

REPORT OF ANALYTICAL RESULTS

Log Number : 85-01-250-1
Sample Description: LADWP HEWITT WELL

General Mineral Analysis
Sampled Date 23 JAN 85

Anions	mg/L	meq/L	Determination	mg/L
Nitrate (as NO3)	7.5	0.1	Hydroxide Alk (as CaCO3)	0.0
Chloride	17	0.5	Carbonate Alk (as CaCO3)	0
Sulfate	28	0.6	Bicarbonate Alk(as CaCO3)	367
Bicarbonate (as CaCO3)	450	7.3	Ca Hardness (as CaCO3)	187
Carbonate Alk (as CaCO3)	0.0	0.0	Mg Hardness (as CaCO3)	115
			Total Hardness	302
Total Millequivalents per Liter		8.5	Iron	<0.13
			Manganese	<0.04
Cations	mg/L	meq/L	Copper	<0.14
			Zinc	<0.018
Sodium	33	1.4	Surfactants	<0.10
Potassium	5.0	0.1	Filterable Residue	760
Calcium (EDTA Titration)	75	3.7	Sp. Conductance, umhos/cm	810
Magnesium	28	2.3	pH, units	7.2
Total Millequivalents per Liter		7.6		

* Conforms to Title 22, California Administrative Code

Edward Wilson, Laboratory Director

LABORATORY
ORDER

BROWN AND CALDWELL
PASADENA, CALIFORNIA

PAGE 1

ORDER NO P87-02-486

ORDER DATE 27 FEB 87
P' 'T DATE 03 MAR 87 10:22AM

DUE: 13 MAR

REPORT TO: LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009
ATTN: Alice Campbell

PHONE: 818/243-4140

LABORATORY ORDER
ACKNOWLEDGEMENT
CUSTOMER COPY

INVOICE: LeRoy Crandall & Associates
900 Grand Central Ave.
Glendale, CA 91201-3009
ATTN: Accounts Payable

PROJECT: E-87057
PHONE: 818/243-4140

HOLD: UNTIL 29 MAR

SAMPLED BY: CLIENT

DELIVERED BY: CLIENT

ITEM	LOG NUMBER	DESCRIPTION OF SAMPLE	SAMPLED DATE/TIME	RECEIVED	TYP
1	02-486-1	Sample #1	27 FEB	27 FEB	GW
	02-486-2	Sample #2	27 FEB		

DETERMINATION	CODE	DEPT	QTY	PRICE	AMOUNT
Alkalinity	ALK	GE	2	410.00	820.00
Calcium (EDTA Titration)	CA,EDTA	GE			
Magnesium	MG	ME			
Chloride	CL	GE			
Copper	CU	ME			
Surfactants	MBAS	GE			
Iron	FE	ME			
Manganese	MN				
pH	PH	GE			
Potassium	K	ME			
Sodium	NA				
Sulfate	SO4	GE			
Specific Conductance	COND				
Filterable Residue (TDS)	TDS				
Zinc	ZN	ME			
Nitrate (as NO3)	NO3	GE			
Ion Balance	ION.BALANCE				
Total Organic Carbon (TOC)	TOC				
Dissolved Digestion	DIG,DISS	ME			
Vol.Pri.Poll. (EPA-624)	624	MS			

ORDER NOTE: PLEASE INCLUDE METHODS WITH ALL REPORTS.

TOTAL AMOUNT DUE $820
INVOICE: WITH REP

INVOICE TO READ:

BROWN AND CALDWELL

ANALYTICAL LABORATORIES

LOG NO: P84-11-118

Received: 08 NOV 84
Reported: 06 DEC 84

Project: E-81001

LeROY CRANDALL & ASSOCIATES
711 N. ALVARADO ST.
LOS ANGELES, CA 90026

ATTN: Mervin Johnson

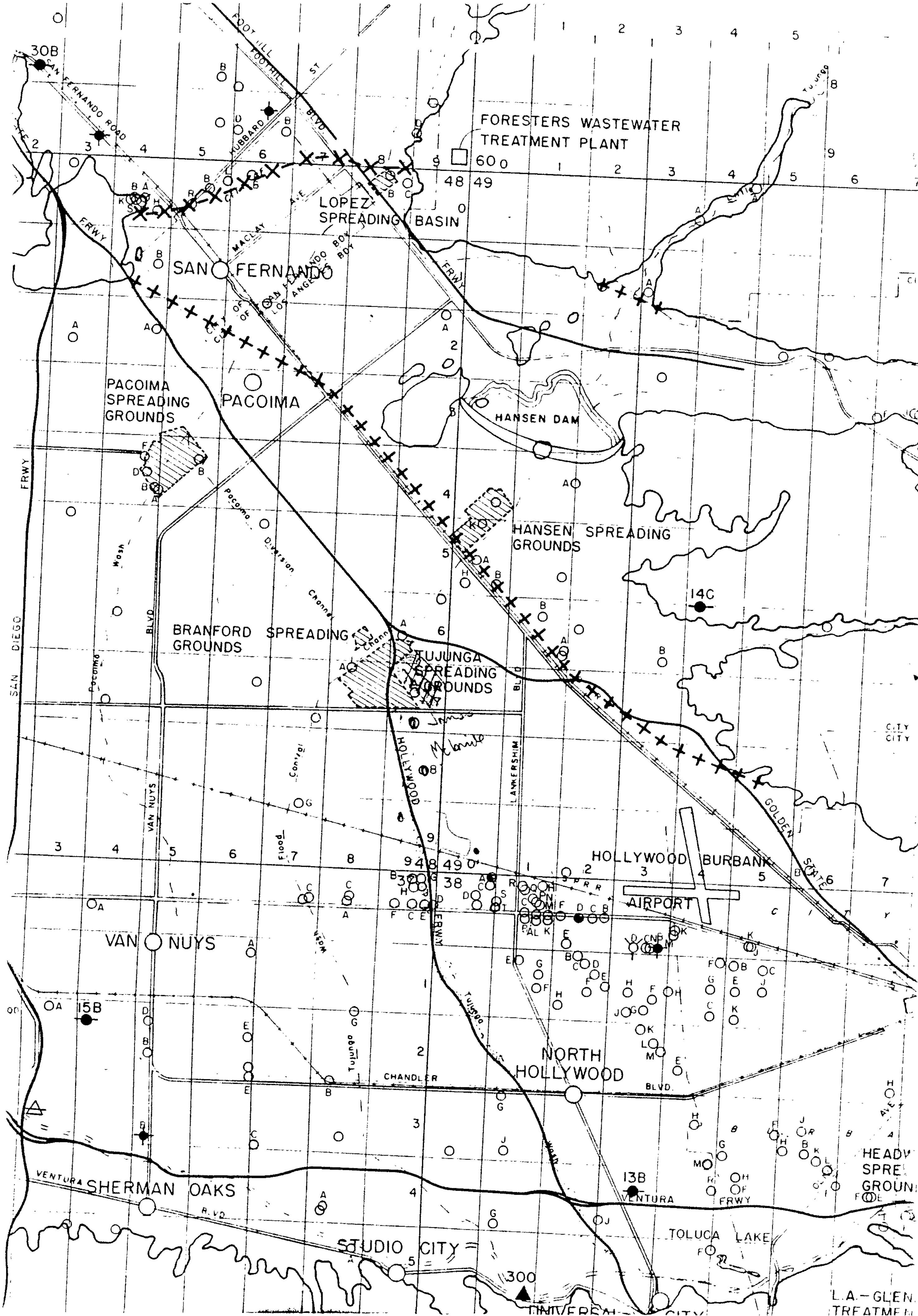
REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, GROUND WATER SAMPLES	DATE SAMPLED
11-118-1	HEWITT WELL #1	08 NOV 84

PARAMETER	11-118-1
Purgeable Priority Pollutants	
Extraction date	11/19/84
^-rolein, ug/L	<10
:ylonitrile, ug/L	<10
Ethylbenzene, ug/L	3
Tetrachloroethylene, ug/L	3
Toluene, ug/L	8
Other Purgeable Priority Pollutants, ug/L	<1
Semi-Quantified Results **	
Xylene Isomers, ug/L	20

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard

Edward Wilson, Laboratory Director



FORESTERS WASTEWATER
TREATMENT PLANT
LOPEZ
SPREADING BASIN
SAN FERNANDO
PACOIMA
SPREADING
GROUNDS
PACOIMA
HANSEN DAM
HANSEN SPREADING
GROUNDS
BRANFORD SPREADING
GROUNDS
TUJUNGA
SPREADING
GROUNDS
14C
HOLLYWOOD BURBANK
AIRPORT
VAN NUYS
15B
NORTH
HOLLYWOOD
SHERMAN OAKS
13B
TOLUCA LAKE
STUDIO CITY
300
30B
L.A.-GLEN
TREATMEN
HEADW
SPRE
GROUN
FOOTHILL BLVD
SAN FERNANDO ROAD
HUBBARD
MACLAY
CHANDLER BLVD.
VENTURA FRWY
VENTURA BLVD.
SAN DIEGO FRWY
VAN NUYS BLVD
LANKERSHIM BLVD
HOLLYWOOD FRWY
GOLDEN STATE
Pacoima Wash
Pacoima Diversion Channel
Tujunga Wash
Flood Wash
Conval

ORM 237 - 6/62 REV. - 2M

SANITARY ENGIN RING DIVISION

YEAR ____________

LOCATION WELL 4897 (James) CHEMICAL ANALYSES (P.P.M.)

ERLETA LANDFILL

Water Quality for Wells
4897
4897A
4898

UPDATED -1986 Reports

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field ALK. CaCO3 LAB.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. KJEL. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	~~As~~ TDS	[illegible]	
1966																															
1-28		[illegible]	34	9.3	122	30	3.3	125	25	17	[illegible]	17	1.0	.16	.21	7.8	21	.00	.08	.04	.19	7.4	2.1		4					.02	
1968																															
4-23		[illegible]	[illegible]	7.7	130	29	[illegible]	[illegible]	37	12	11	19								.33	.33	7.6	<.5		4			1.2		<.02	
1970																															
1-18		499			167			[illegible]																	4						
1971																															
-21		[illegible]	[illegible]	[illegible]	336	-	-	[illegible]	36	17	4.0										.10	6.7			8					<.05	
5-26		96[illegible]			[illegible]			[illegible]			1.8											7.6			22						
-22		8[illegible]6	100	22	[illegible]	[illegible]	[illegible]	[illegible]	41	13	[illegible]										.13	[illegible]			[illegible]					[illegible]	
1-7		991	112	22	372	60	11.9	412	44	11	3.3	[illegible]									.18	6.4			28					<.05	
7-[illegible]		850						[illegible]														7.0			19						
8-3		1?80	98	20	338			[illegible]			5.6											5.2			24						
9-17		926			344			410														7.8			20						
1-8 *		950						[illegible]									[illegible]					8.6			5						
1972																															
9-13		960	106	21	352	54	5.6	435 406	34	14	4.2	19	.02	.44	.22	7.55	23	.00	.12	.000	.10	7.0			31					<.05	
1973																															
1-26		976	[illegible]	26	410	43	4.3	212 215	33	13	2.2	22	.01	.62	.26	7.2 7.34	17 25	.00	.12	.000	.06	7.2	1.5		31				[illegible]	<.01	
[illegible]-29		264			375			[illegible]	35	14						7.30					.07	8.2			28						
[illegible]-19		670	80	15	260	47	11.1	312	35	11	6.7	20	.01	.42	.35	7.63	27					7.4			4						
2-10		1000 996	120	24	400	117	5.2	450 430	30	14	4.9					7.19	17 25	.00	.08	.020	.06	3.6			38					[illegible]	1.8
1974																															
3-13		[illegible]	[illegible]	15	250	44	11.3	290 [illegible]	12	11						7.62	[illegible]	.00	.04		.02	8.0			10				312		
[illegible]-20		[illegible]	[illegible]	16	304	73	[illegible]	[illegible]	30	13						7.30	17 20					7.8			36				[illegible]		

* [illegible] pumped [illegible]

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SANITARY ENGINEERING DIVISION

YEAR ______

LOCATION WELL 4897A (Suerdam-Crista) CHEMICAL ANALYSES (P.P.M.)

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field ALK. $CaCO_3$ LAB.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. KJEL. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	TDS	Pb	
1966																															
5-16		[illegible]	91	[illegible]	320	26	4.3	278	40	22	3.0	22	.15	.26	.22	[illegible]	[illegible]	.02	.06	.06	.10	5.9	2.7		147	1				.01	PP
2-28		1790	188	68	1000	41	7.6	[illegible]	25	20	2.7	29	6.0	.33	.02	6.82	12	.00	.12	.40	.21	0.9	17		60	36				.03	PP
1968																															
4-23		[illegible]	278	71	986	50	7.7	[illegible]	26	27	2.2	27	.8	.39		6.4 6.7	17 25	.00	.24	.08	.22	0.5	4.9		219	28		12		.02	PP
5-29		[illegible]	278	—	950	—	—	1000	—	—	—	—	1.2	.07			— —	—	—	—	—	2.1	—		257	—		11		—	PP
1970																															
10-21		[illegible]	278	61	820	52	7.7	[illegible]	15	39	0.0					6.65	17 211		1.2		.34	0.0			205			15			PP
11-18		[illegible]	—	—	800	—	—	850	—	—	—					7.55	— —		—		—				176						[illegible]
12-5		1540	230	50	780	53	—	[illegible]	25	31	0.1				0.2	6.63	18 23		0.64			0			345					0.05	PP
1971																															
1-71		[illegible]	[illegible]	52	680			[illegible]	[illegible]	26	0.6					6.0 6.51	18 17				0.18	0			[illegible]		2.2			[illegible]	[illegible]
3-29		[illegible]	—	—	760			[illegible]			0.8					6.59	27				—	0			170					—	[illegible]
6-21		[illegible]	210	50	730	50	[illegible]	[illegible]	20	20	1.2		1.6			[illegible]	[illegible]				0.13	0			[illegible]					[illegible]	[illegible]
1-8		[illegible]						[illegible]														0			276						
1-19		1050						[illegible]			1.7					6.65						0			308						[illegible]
[illegible]		1400	216	51	750			800								6.3 —	25					0			292						PP
[illegible]-20		[illegible]			695			[illegible]								6.7									270						[illegible]
[illegible]-4	*	[illegible]														[illegible]						0			280						[illegible]
1972																															
9-30		[illegible]	218	24	510	43	[illegible]	[illegible]	23	11	1.1	27	.13	.45	.17	6.76	26						2.8		126						[illegible]
1973																															
1-20		[illegible]	170	24	400	33	4.3	[illegible]	34	11	—	10			.14	[illegible] —	[illegible]					[illegible]			89		9.9		524		[illegible]
1-23		1020						112								6.8						0.9			90						
1-24		970						[illegible]								7.0						0.4			100						
1-25		[illegible]														7.1						0.6			95						

SANITARY ENGIN ERING DIVISION

YEAR ______

LOCATION Well 4897A ([illegible]) CHEMICAL ANALYSES (P.P.M.)

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field ALK. $CaCO_3$ LAB.	SO_4	Cl	NO_3	SiO_2	Fe	B	F	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. KJEL. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	~~[illegible]~~ TDS	$K_{D,TB}$	
1973																															
																															IP
5-10		[illegible]						[illegible]								7.7						1.0			79						IP
6-11		850																													IP
6-18		941			360			[illegible]			1.6					7.04	25	.03	.14	.00	.08	5.7	2.5				1.9	9			IP
6-25		800																													IP
8-24		796	[illegible]	22	360	35	4.9	[illegible]	37	11						7.26	26	.03	.15		.09	7.4									IP
1974																															
3-13		[illegible]	[illegible]	22	307	33	4.9	[illegible]	37	11						7.02	25	.02	.14		1.3	7.6			7				866		IP
9-18		[illegible]	[illegible]	[illegible]	320	32	[illegible]	370	[illegible]	[illegible]	[illegible]					6.97	22					8.8			76						IP
1980																															
5-28		1640	232	61	830	44	8.2	900	18	21	0.9					6.72	23				.17				360		17				
8-26		1340	92	46	392	42	6.6	750 420	17	24	2.1	40				6.75	21 24	0.48	.80		.08	.7			168			14			
1983																															
-7		1600	181	54	680	40	6.0	520	12	77			5.8			7.0	19								170	2					
-27		1220	165	46	600	43	6.0	565	4	84		67			.72	7.39	25.1	.46	1.58		.02										

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SANITARY ENGINEERING DIVISION

YEAR ______

LOCATION WELL 489B (Stratford-Whitsett) CHEMICAL ANALYSES (P.P.M.) ARLETA

Date	Lab. No.	Sp. Cond.	Ca	Mg	Total Hardness	Na	K	Field Alk. $CaCO_3$ Lab.	SO_4	Cl	NO_3	SiO_2	Fe	B	F
1974															
6-17		53[illegible]	56	11	184	39	3.8	[illegible] 200	38	16	15				
7-14		610	75	14	246	48	4.4	240 240	38	21	—				
9-18		[illegible]	[illegible]	[illegible]	222	47	4.4	250 [illegible]	[illegible]	[illegible]	[illegible]				
0-16		629	72	13	232	44	4.1	250 240	40	20	35				
1975															
-10		491	50	11	168	37	3.5	1[illegible] 170	28	70	12				
0-8		735	86	15	276	50	4.3	260 270	41	28	33				
-24-77		516	54	11	180	38	3.5	215	35	12	7.9		.02	.48	
-21-78		537	58	11	188	44	3.6	235 232	37	9.9	4.8		0.15		
-1-78		546	61	11	196	44	3.7	227 240	33	11	5.6		0.04		
0-25-78		888	110	25	376	42	4.4	325	53	34	51		0.02		
-6-79		710	85	15	272	53	4.6	330 335	30	13	16.0		0.04		
-24-79		1020	136	26	445	50	5.2	410 400	60	28	53	23	0.09		
-24-80		1080	110	28	465	54	5.1	420 440	77	33	44	18	<.01		
-7-80		984	132	27	440	61	5.8	500 410	93	24	29	27	<.01		

Date	Field pH Lab.	Field Temp. Lab.	NH_3	Tot. Kjel. N	NO_2	Diss PO_4	Field D.O. Lab.	BOD	Cr^{+6}	~~Color~~ CO_2	Turb	~~Odor~~ TOC	~~Phen~~ COD	~~As~~ TDS	[illegible]	[illegible]
1974																
6-17	7.77	16 23					8.0			4						PP
7-14	7.63	25					7.8			6						PP
9-18	7.62	22					8.0			5						4.9
0-16	7.70	17 23					8.2			7						
1975																
-10	8.0 7.95	18 24					8.0			54						
0-8	7.60	16 24					7.1			10		1.6				
-24-77	7.78						9.2			7			4.0			
-21-78	7.61						7.6			5			1.8			
-1-78	7.50	16 23					12.8			5			1.1			
0-25-78	7.65	24														
-6-79	7.59	16					11			8						
-24-79	7.31	16 25					9			35		5.2				
-24-80	7.66	16 22					7.6			32		1.1				
-7-80	8.47						7.9			50						

WATER QUALITY DIVISION
LAB REPORT OF ANALYSIS

C. J. ROGERS
JUL 10 1985

Results in mg/l unless otherwise indicated

Sample No	Date Taken	Date Rec'd	Collector	Description
-1322	5-1-85	5-1-85	CWS	Janns Well (4897)
-1323	"	"	"	McBride Well (4898)

Carl Spangenberg
JUL 10 1985

Sample No.	Date Anal	5-1322	Date Anal	5-1323
Phenols (ppb)				
Total Solids	5/1 FF	312	5/1 FF	480
Suspended Solids	5/1 FF	8.4	5/1 FF	0.3
Dissolved Solids	5/1 FF	304	5/1 FF	480
Oil and Grease				
Total Hardness (as $CaCO_3$)	5/1	[illegible]		[illegible]
MPN/ml-Tot. Coliform				
MPN/ml-Fecal Coliform				
Lead (Pb)	5/23	<0.01	5/23	<0.01
Cadmium (Cd)	5/28	<0.002	5/28	<0.002
Manganese (Mn)	5/22	2.1	5/22	0.04
Cyanide (CN)				
Bromide (Br^-)		<0.01	7/2 FC	0.32
Selenium (Se)	5/1	<0.003	5/1	<0.003
Iodide (I^-)	5/7	0.02	[illegible]	0.02
Barium (Ba)	5/22	<0.1	5/22	0.3
Zinc (Zn)	5/25	<0.01	[illegible]	<0.01
Copper (Cu)	5/22	0.01	5/22	<0.01
Silver (Ag)	5/22	<0.01	5/22	<0.01
Mercury-mcg/litre (Hg)				
Total Chromium		<0.01		<0.01
Hexavalent Chromium (Cr^{+6})	5/1	<.003		<.003
Boron (B)	5/3	.37	5/3	0.42
Iron (Fe)	5/2	1.45	5/2	0.01
Aluminum (Al)	7/2	0.01	7/2	0.02
Arsenic (As)	5/23	<0.01	5/23	<0.01
Nickel (Ni)	5/22	<0.01	5/22	<0.01

R. K. KURIMOTO
JUL 10 1985

REMARKS: Return Results to Carl Spangenberg

WS-234 Rev. 3/83

CHECKED BY

LOS [illegible]GELES DEPARTMENT OF WATER & [illegible]ER

WATER QUALITY DIVISION

REPORT OF WATER ANALYSIS

(Chemical Results in Parts Per Million)

O. J. ROGERS
MAY 14 1984

Sample No	Date Taken	Date Rec'd	Collector	Description
1300	4-24-84	4-24-84	DPG	Janns Well No. 4897
1301	"	"	"	Wicks Well No. 4897A

Sample No.	Date Anal	1300	Date Anal	1301
Conductivity, µmhos/cm		[illegible]		[illegible]
pH, Field		6.5		6.35
pH, Lab.	4/24 FE	7.05	4/24 PG	6.91
Temperature °C, Field		16.5		15
Temperature °C, Lab.	4/24 PG	[illegible]	4/25 PG	23.0
Calcium (Ca)		43		[illegible]
Magnesium (Mg)		12		[illegible]
Total Hardness as $CaCO_3$		156		[illegible]
Sodium (Na)	[illegible]	16		20
Potassium (K)	[illegible]	[illegible]		[illegible]
Alkalinity as $CaCO_3$ (Total), Field		142.5		217.5
Alkalinity as $CaCO_3$ (Total), Lab		[illegible]		[illegible]
Sulfate (SO_4)	[illegible]	[illegible]	[illegible]	7.5
Chloride (Cl)		[illegible]		[illegible]
Silica (SiO_2)	[illegible]	40	[illegible]	61
Iron (Fe)	[illegible]	[illegible]	[illegible]	[illegible]
Boron (B)	[illegible]	[illegible]	[illegible]	[illegible]
Fluoride (F)	[illegible]	0.73	[illegible]	0.27
Nitrate (NO_3)	[illegible]	[illegible]	[illegible]	[illegible]
Nitrite (NO_2)	[illegible]	0.03	[illegible]	<0.001
Ammonia (NH_3)	[illegible] FE	0.10	[illegible] FE	[illegible]
Total Kjeldahl Nitrogen (N)	[illegible]	[illegible]		[illegible]
Phosphate (PO_4)	[illegible]	[illegible]	[illegible]	0.16
Syndets (Apparent LAS)	[illegible]	[illegible]	[illegible]	[illegible]
TDS	[illegible]	280	[illegible]	328
CO_2 (Field)		17		24
Dissolved Oxygen (field)		1.6		2.5
Pumping Depth				
Standing Water (above pump)				
Gallons Pumped				

R. K. KURIMOTO
MAY 14 1984

REMARKS: Results to D.P.G.

FORM 201 — Rev. 3/83 WS-235

CHECKED BY

O. J. ROGERS
MAY 30 1986

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality

REPORT PREPARED BY: (SIGNATURE) Fe Bordey

DATE OF REPORT: 5-28-86

SYSTEM NAME:

NUMBER: 051017

WELL NAME AND/OR NUMBER:

STATE WELL NUMBER:

DESCRIPTION OF SAMPLING POINT: Wick's Well

NAME OF SAMPLER: JGD

SAMPLER EMPLOYED BY: DWP

DATE/TIME SAMPLE COLLECTED: 5-7-86

DATE/TIME SAMPLE RECEIVED @ LAB: 5-7-86

DATE ANALYSES COMPLETED: 5-9-86

Were all the constituents listed below quantified? yes

TEST METHODS: 624 GC/MS

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/1	34030	1.13	1.1
Bromodichloromethane	ug/1	32101	ND	1.5
Bromoform	ug/1	32104	ND	1.5
Bromomethane	ug/1	34413	ND	1.5
Ca[illegible]on tetrachloride	ug/1	32102	ND	1.5
Chlorobenzene	ug/1	34301	ND	1.1
Chloroethane	ug/1	34311	ND	1.5
2-Chloroethylvinyl ether	ug/1	34576	ND	1.5
Chloroform	ug/1	32106	ND	1.5
Chloromethane	ug/1	34418	ND	1.5
bis (2-Chloroethyl) ether	ug/1	34273	ND	5.10
Dibromochloromethane	ug/1	32105	ND	1.5
1,2-Dichlorobenzene	ug/1	34536	ND	1.5
1,3-Dichlorobenzene	ug/1	34566	ND	1.15
1,4-Dichlorobenzene	ug/1	34571	41.12	1.15
Dichlorodifluoromethane	ug/1	34668	ND	2.10
1,1-Dichloroethane	ug/1	34496	ND	1.15
1,2-Dichloroethane	ug/1	34531	ND	1.15
1,1-Dichloroethene	ug/1	34501	ND	1.12
trans-1,2-Dichloroethene	ug/1	34546	ND	1.15
1,2-Dichloropropane	ug/1	34541	ND	1.15
c[illegible]-1,3-Dichloropropene	ug/1	34704	ND	1.15

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
trans-1,3-Dichloropropene	ug/l	34699	ND	0.5
Ethyl benzene	ug/l	34371	ND	0.5
Methylene chloride	ug/l	34423	ND	0.5
Methyl Ethyl Ketone	ug/l	81595	ND	5.0
Methyl Isobutyl Ketone	ug/l	81596	ND	1.0
1,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
Tetrachloroethene	ug/l	34475	ND	0.5
Toluene	ug/l	34010	ND	0.1
1,1,1-Trichloroethane	ug/l	34506	ND	0.5
1,1,2-Trichloroethane	ug/l	34511	ND	0.5
Trichloroethene	ug/l	39180	ND	0.5
Trichlorofluoromethane	ug/l	34488	ND	0.5
Vinyl chloride	ug/l	39175	ND	0.5
Xylenes	ug/l	81551	ND	0.1
cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 trichloropropane	ug/l		ND	0.5

JEFF DOBROWOLSKI
MAR 31 1986

O. J. ROGERS
MAR 26 1986

3-28-86
MAR 26 1986
Shirley Cheng

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ABORATORY AME: DWP- Water Quality

REPORT PREPARED BY: (SIGNATURE) Fe Bordey

DATE OF REPORT: 3-24-86

NUMBER: 05838

YSTEM AME:

ELL NAME ND/OR NUMBER:

STATE WELL NUMBER:

DESCRIPTION OF SAMPLING POINT: Wicks Well 4897A

NAME OF SAMPLER: JGD

SAMPLER EMPLOYED BY: DWP

DATE/TIME SAMPLE COLLECTED: 3-11-86

DATE/TIME SAMPLE RECEIVED @ LAB: 3-11-86

DATE ANALYSES COMPLETED: 3-17-86

Were all the constituents listed below quantified? yes

TEST METHODS: 624 GC/MS

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	0.7	0.1
Bromodichloromethane	ug/l	32101	ND	0.5
Bromoform	ug/l	32104	0.8	0.5
Br[illegible]omethane	ug/l	34413	ND	0.5
Ca[illegible]n tetrachloride	ug/l	32102	ND	0.5
Chlorobenzene	ug/l	34301	0.2	0.1
Chloroethane	ug/l	34311	ND	0.5
2-Chloroethylvinyl ether	ug/l	34576	ND	0.5
Chloroform	ug/l	32106	ND	0.5
Chloromethane	ug/l	34418	ND	5.0
bis (2-Chloroethyl) ether	ug/l	34273	ND	0.5
Dibromochloromethane	ug/l	32105	ND	0.5
1,2-Dichlorobenzene	ug/l	34536	1.0	0.5
1,3-Dichlorobenzene	ug/l	34566	ND	0.5
1,4-Dichlorobenzene	ug/l	34571	7.5	0.5
Dichlorodifluoromethane	ug/l	34668	ND	2.0
1,1-Dichloroethane	ug/l	34496	ND	0.5
1,2-Dichloroethane	ug/l	34531	ND	0.5
1,1-Dichloroethene	ug/l	34501	ND	0.2
trans-1,2-Dichloroethene	ug/l	34546	ND	0.5
[illegible]-Dichloropropane	ug/l	34541	ND	0.5
c[illegible]-1,3-Dichloropropene	ug/l	34704	ND	0.5

URGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
rans-1,3-Dichloropropene	ug/l	34699	ND	0.5
thy benzene	ug/l	34371	ND	0.5
ethylene chloride	ug/l	34423	ND	0.5
ethyl Ethyl Ketone	ug/l	81595	ND	5.0
ethyl Isobutyl Ketone	ug/l	81596	ND	1.0
,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
etrachloroethene	ug/l	34475	ND	0.5
oluene	ug/l	34010	ND	0.1
,1,1-Trichloroethane	ug/l	34506	ND	0.5
,1,2-Trichloroethane	ug/l	34511	0.6	0.5
richloroethene	ug/l	39180	ND	0.5
richlorofluoromethane	ug/l	34488	ND	0.5
inyl chloride	ug/l	39175	ND	0.5
ylenes	ug/l	81551	ND	0.1
Cis 1, 2 dichloroethene	ug/l		ND	0.5
1, 2, 3 trichloropropane	ug/l		ND	0.5

SEB _D
DLE-5/84

C.J Spangenberg

JAN 09 1985

O. U. ROGERS
JAN 07 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ABORATORY AME: Dwp- Water Quality	REPORT PREPARED BY: (SIGNATURE) F J Bradley	DATE OF REPORT: 12-18-84
YSTEM AME:		NUMBER: 05415
ELL NAME ND/OR NUMBER:	STATE WELL NUMBER:	
ESCRIPTION OF AMPLING POINT: Wicks well 4897A		
AME OF AMPLER: C W Spangenberg	SAMPLER EMPLOYED BY: Dwp	
ATE/TIME AMPLE COLLECTED: 12-12-84	DATE/TIME SAMPLE RECEIVED @ LAB: 12-12-84	DATE ANALYSES COMPLETED: 12-13-84
EST METHODS: GC/MS	Were all the constituents listed below quantified? Yes	

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
enzene	ug/l	34030	<1.1	
romodichloromethane	ug/l	32101 ~~33101~~	ND	
romoform	ug/l	32104	ND	
rom-methane	ug/l	34413	ND	
arbon tetrachloride	ug/l	32102	ND	
hlorobenzene	ug/l	34301	<1.1	
hloroethane	ug/l	34311	ND	
-Chloroethylvinyl ether	ug/l	34576	ND	
hloroform	ug/l	32106	ND	
hloromethane	ug/l	34418	ND	
is (2-Chloroethyl) ether	ug/l	34273	ND	
ibromochloromethane	ug/l	32105	ND	
,2-Dichlorobenzene	ug/l	34536	<1.1	
,3-Dichlorobenzene	ug/l	34566	ND	
,4-Dichlorobenzene	ug/l	34571	9.1	
chlorodifluoromethane	ug/l	34668	ND	
1-Dichloroethane	ug/l	34496	ND	
2-Dichloroethane	ug/l	34531	ND	
1-Dichloroethene	ug/l	34501	ND	
ans-1,2-Dichloroethene	ug/l	34546	ND	
2- chloropropane	ug/l	34541	ND	
-1,3-Dichloropropene	ug/l	34704	ND	

GEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ns-1,3-Dichloropropene	ug/l	34699	ND	
yl ' zene	ug/l	34371	ND	
hylene chloride	ug/l	34423	<1.	
hyl Ethyl Ketone	ug/l	81595	ND	
hyl Isobutyl Ketone	ug/l	81596	ND	
,2,2-Tetrachloroethane	ug/l	34516	ND	
rachloroethene	ug/l	34475	ND	
uene	ug/l	34010	ND	
,1-Trichloroethane	ug/l	34506	ND	
,2-Trichloroethane	ug/l	34511	ND	
ichloroethene	ug/l	39180	ND	
ichlorofluoromethane	ug/l	34488	ND	
hyl chloride	ug/l	39175	ND	
lenes	ug/l	81551	<1.	

Note any unidentified peaks below

JEFF DOBROWOLSKI
MAR 31 1986

. ROGERS
MAR 26 1986

M. Thew
3-28-86

MAR 26 1986
Shirley Cheng

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ABORATORY AME: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) Fe Bordey	DATE OF REPORT: 3-24-86
YSTEM AME:		NUMBER: 05836
ELL NAME ND/OR NUMBER:		STATE WELL NUMBER:
ESCRIPTION OF AMPLING POINT: Janss Well (4897)		
AME OF AMPLER: JGD		SAMPLER EMPLOYED BY: DWP
ATE/TIME AMPLE COLLECTED: 3-11-86	DATE/TIME SAMPLE RECEIVED @ LAB: 3-11-86	DATE ANALYSES COMPLETED: 3-14-86
EST METHODS: 624 GC/MS		Were all the constituents listed below quantified? yes

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
enzene	ug/1	34030	0.1	0.1
romodichloromethane	ug/1	32101	ND	0.5
romoform	ug/1	32104	ND	0.5
Br omethane	ug/1	34413	ND	0.5
Car tetrachloride	ug/1	32102	ND	0.5
Chlorobenzene	ug/1	34301	ND	0.1
Chloroethane	ug/1	34311	ND	0.5
2-Chloroethylvinyl ether	ug/1	34576	ND	0.5
Chloroform	ug/1	32106	ND	0.5
Chloromethane	ug/1	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/1	34273	ND	5.0
Dibromochloromethane	ug/1	32105	ND	0.5
1,2-Dichlorobenzene	ug/1	34536	ND	0.5
1,3-Dichlorobenzene	ug/1	34566	ND	0.5
1,4-Dichlorobenzene	ug/1	34571	ND	0.5
Dichlorodifluoromethane	ug/1	34668	ND	2.0
1,1-Dichloroethane	ug/1	34496	ND	0.5
1,2-Dichloroethane	ug/1	34531	ND	0.5
1,1-Dichloroethene	ug/1	34501	ND	0.2
trans-1,2-Dichloroethene	ug/1	34546	ND	0.5
1 -Dichloropropane	ug/1	34541	ND	0.5
ci ,3-Dichloropropene	ug/1	34704	ND	0.5

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
trans-1,3-Dichloropropene	ug/l	34699	ND	0.5
Ethylbenzene	ug/l	34371	ND	0.5
Methylene chloride	ug/l	34423	ND	0.5
Methyl Ethyl Ketone	ug/l	81595	ND	5.0
Methyl Isobutyl Ketone	ug/l	81596	ND	1.0
1,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
Tetrachloroethene	ug/l	34475	ND	0.5
Toluene	ug/l	34010	0.7	0.1
1,1,1-Trichloroethane	ug/l	34506	0.9	0.5
1,1,2-Trichloroethane	ug/l	34511	ND	0.5
Trichloroethene	ug/l	39180	ND	0.5
Trichlorofluoromethane	ug/l	34488	ND	0.5
Vinyl chloride	ug/l	39175	ND	0.5
Xylenes	ug/l	81551	ND	0.1
Cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 Trichloropropane	ug/l		ND	0.5

SEB-SD
DLB-5/84

JEFF DOBROWOLSKI
FEB 19 1986

O. J. ROGERS
FEB 1 8 1900

Shirley Cheng
1986

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) F. Bordey	DATE OF REPORT: 2-18-86
		NUMBER: 05784
SYSTEM NAME:		STATE WELL NUMBER:
WELL NAME AND/OR NUMBER:		
DESCRIPTION OF SAMPLING POINT: Sheldon Arleta 4897		SAMPLER EMPLOYED BY: DWP
NAME OF SAMPLER: J. Dobrowolski	DATE/TIME SAMPLE RECEIVED @ LAB: 2-11-86	DATE ANALYSES COMPLETED: 2-13-86
DATE/TIME SAMPLE COLLECTED: 2/11/86		Were all the constituents listed below quantified? yes
TEST METHODS: 624 GC/MS		

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
nzene	ug/1	34030	2.2	0.1
omodichloromethane	ug/1	32101	ND	0.5
omoform	ug/1	32104	ND	0.5
omomethane	ug/1	34413	ND	0.5
rbo.. tetrachloride	ug/1	32102	ND	0.5
lorobenzene	ug/1	34301	ND	0.1
loroethane	ug/1	34311	ND	0.5
-Chloroethylvinyl ether	ug/1	34576	ND	0.5
hloroform	ug/1	32106	ND	0.5
hloromethane	ug/1	34418	ND	0.5
is (2-Chloroethyl) ether	ug/1	34273	ND	5.0
dibromochloromethane	ug/1	32105	ND	0.5
.2-Dichlorobenzene	ug/1	34536	8.6	0.5
,3-Dichlorobenzene	ug/1	34566	1.7	0.5
,4-Dichlorobenzene	ug/1	34571	18.	0.5
Dichlorodifluoromethane	ug/1	34668	ND	2.0
,1-Dichloroethane	ug/1	34496	ND	0.5
1,2-Dichloroethane	ug/1	34531	ND	0.5
1,1-Dichloroethene	ug/1	34501	ND	0.2
trans-1,2-Dichloroethene	ug/1	34546	ND	0.5
1.' ichloropropane	ug/1	34541	ND	0.5
cis-1,3-Dichloropropene	ug/1	34704	ND	0.5

RGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ans-1,3-Dichloropropene	ug/l	34699	ND	0.5
hyl benzene	ug/l	34371	3.4	0.5
thylene chloride	ug/l	34423	ND	0.5
thyl Ethyl Ketone	ug/l	81595	ND	5.0
thyl Isobutyl Ketone	ug/l	81596	ND	1.0
1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
trachloroethene	ug/l	34475	ND	0.5
luene	ug/l	34010	27.1	0.1
1,1-Trichloroethane	ug/l	34506	ND	0.5
1,2-Trichloroethane	ug/l	34511	ND	0.5
ichloroethene	ug/l	39180	ND	0.5
ichlorofluoromethane	ug/l	34488	ND	0.5
inyl chloride	ug/l	39175	ND	0.5
lenes	ug/l	81551	7.0	0.1
Cis 1,2 dichloroethene	ug/l		ND	0.5
1,2,3 Trichloropropane	ug/l		ND	0.5

SES-SD
DLS-5/8

Carl Spangenberg MAY 20 1985

Shirley Cheng MAY 20 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP- Water Quality	REPORT PREPARED BY: (SIGNATURE) [signature]	DATE OF REPORT: 5-16-85
SYSTEM NAME:		NUMBER: 05706
WELL NAME AND/OR NUMBER:	STATE WELL NUMBER:	
DESCRIPTION OF SAMPLING POINT: Janns 4897		
NAME OF SAMPLER: CW Spangenberg	SAMPLER EMPLOYED BY: DWP	
DATE/TIME SAMPLE COLLECTED: 5-1-85	DATE/TIME SAMPLE RECEIVED @ LAB: 5-1-85	DATE ANALYSES COMPLETED: 5-6-85
TEST METHODS: 624 GC/MS	Were all the constituents listed below quantified? Yes	

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/1	34030	0.2	0.1
Bromodichloromethane	ug/1	32101	ND	0.5
Bromoform	ug/1	32104	ND	0.5
Bromomethane	ug/1	34413	ND	0.5
Carbon tetrachloride	ug/1	32102	ND	0.5
Chlorobenzene	ug/1	34301	ND	0.1
Chloroethane	ug/1	34311	ND	0.5
2-Chloroethylvinyl ether	ug/1	34576	ND	0.5
Chloroform	ug/1	32106	ND	0.5
Chloromethane	ug/1	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/1	34273	ND	10.
Dibromochloromethane	ug/1	32105	ND	1.0
1,2-Dichlorobenzene	ug/1	34536	ND	0.5
1,3-Dichlorobenzene	ug/1	34566	ND	0.5
1,4-Dichlorobenzene	ug/1	34571	ND	0.5
Dichlorodifluoromethane	ug/1	34668	ND	10.
1,1-Dichloroethane	ug/1	34496	ND	0.5
1,2-Dichloroethane	ug/1	34531	ND	0.5
1,1-Dichloroethene	ug/1	34501	ND	0.2
trans-1,2-Dichloroethene	ug/1	34546	ND	0.5
1,2 Dichloropropane	ug/1	34541	ND	0.5
cis-1,3-Dichloropropene	ug/1	34704	ND	0.5

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
...ns-1,3-Dichloropropene	ug/l	34699	ND	0.5
...yl benzene	ug/l	34371	ND	0.5
...thyl e chloride	ug/l	34423	<0.5	0.5
...thyl Ethyl Ketone	ug/l	81595	ND	1.0
...thyl Isobutyl Ketone	ug/l	81596	ND	1.0
...1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
...trachloroethene	ug/l	34475	ND	0.5
...luene	ug/l	34010	ND	0.1
...1,1-Trichloroethane	ug/l	34506	ND	0.5
...1,2-Trichloroethane	ug/l	34511	ND	0.5
...ichloroethene	ug/l	39180	ND	0.5
...ichlorofluoromethane	ug/l	34488	ND	0.5
...nyl chloride	ug/l	39175	ND	0.5
...lenes	ug/l	81551	ND	0.1

Note any unidentified peaks below

...hloropicrin	ug/l	ND	5.0
...BCP	ug/l	ND	5.0
...2 3 ~~Trichloropropane~~	ug/l	ND	0.5
...is 1, 2 dichloroethene	ug/l	ND	0.5

SL SD
DLB-5/84

C. J. ROGERS
JUL 10 1985

WATER QUALITY DIVISION
LAB REPORT OF ANALYSIS

Results in mg/l unless otherwise indicated

Lab No	Date Taken	Date Rec'd	Collector	Description
5-1322	5-1-85	5-1-85	CWS	Janns Well (4897)
5-1323	"	"	"	McBride " (4898)

JUL 10 1985

Sample No.	Date Anal	5-1322	Date Anal	5-1323
Temperature °C Field				
Temperature °C Lab	5/1	24		24
Turbidity (NTU Units)	5/1	36		0.8
Color (Apparent Units)	5/1 W	70+		3
Odor (Threshold)		Ep2.0		Ch 1.4
pH (Field)				
pH (Lab)	5/1	7.3		7.3
Specific Elect. Cond.	5/1	487		700
DO (Lab)	5/1	2.1		4.8
DO (Field)				
BOD_5	5/6	6.6		5.0
COD	5/7	13.		23
SOC	[illegible]	1.3	[illegible]	1.1
Alkalinity				
Total Alkalinity (as $CaCO_3$)	5/1	320		320
Hydroxide (as $CaCO_3$)	5/1	0		0
Carbonate (as $CaCO_3$)	5/1	0		0
Bicarbonate (as $CaCO_3$)	5/1	320		320
Chloride (Cl)	5/1	[illegible]		[illegible]
Sulfate (SO_4)	5/2	23	[illegible]	[illegible]
Phosphate (P)	[illegible]	0.05	[illegible]	0.08
Nitrate (N)	5/8	0.12	5/1	0.83
Nitrite (N)	5/1	.004		.003
Ammonia (N)	5/1	.22		.01
Total Kjeldahl Nitrogen (N)	W	.38		.08
Surfactants (MBAS)	5/2	<.05	[illegible]	<.05
Sodium (Na)	[illegible]	18	[illegible]	37
Calcium (Ca)	[illegible]	[illegible]		[illegible]
Magnesium (Mg)	[illegible]	17		7.1
Potassium (K)	[illegible]	3.2	[illegible]	5.4

R. K. KURIMATA
JUL 10 1985

REMARKS: Return Results to Carl Spangenberg

FORM 206 WS-224 Rev. 3/81

CHECKED BY

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

ABORATORY AME: DWP - Water Quality	REPORT PREPARED BY: (SIGNATURE) Je Endey	DATE OF REPORT: 5-16-85
YSTEM AME:		NUMBER: 05707
ELL NAME ND/OR NUMBER:		STATE WELL NUMBER:
ESCRIPTION OF AMPLING POINT: Mc Bride (4898)		
AME OF AMPLER: CW Spangenberg		SAMPLER EMPLOYED BY: DWP
ATE/TIME AMPLE COLLECTED: 5-1-85	DATE/TIME SAMPLE RECEIVED @ LAB: 5-1-85	DATE ANALYSES COMPLETED: 5-6-85
EST METHODS: 624 GC/MS		Were all the constituents listed below quantified? yes

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
enzene	ug/l	34030	ND	0.1
romodichloromethane	ug/l	32101	ND	0.5
romoform	ug/l	32104	ND	0.5
r omethane	ug/l	34413	ND	0.5
art tetrachloride	ug/l	32102	ND	0.5
hlorobenzene	ug/l	34301	ND	0.1
hloroethane	ug/l	34311	ND	0.5
-Chloroethylvinyl ether	ug/l	34576	ND	0.5
hloroform	ug/l	32106	ND	0.5
hloromethane	ug/l	34418	ND	0.5
is (2-Chloroethyl) ether	ug/l	34273	ND	10.1
ibromochloromethane	ug/l	32105	ND	1.0
,2-Dichlorobenzene	ug/l	34536	ND	0.5
,3-Dichlorobenzene	ug/l	34566	ND	0.5
,4-Dichlorobenzene	ug/l	34571	ND	0.5
ichlorodifluoromethane	ug/l	34668	ND	7.1
,1-Dichloroethane	ug/l	34496	ND	0.5
,2-Dichloroethane	ug/l	34531	ND	0.5
,1-Dichloroethene	ug/l	34501	ND	0.2
rans-1,2-Dichloroethene	ug/l	34546	ND	0.5
,2 chloropropane	ug/l	34541	ND	0.5
is-1,3-Dichloropropene	ug/l	34704	ND	0.5

RGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
ans-1,3-Dichloropropene	ug/l	34699	ND	0.5
hyl benzene	ug/l	34371	ND	0.5
thy e chloride	ug/l	34423	ND	0.5
ethyl Ethyl Ketone	ug/l	81595	ND	1.0
ethyl Isobutyl Ketone	ug/l	81596	ND	1.0
,1,2,2-Tetrachloroethane	ug/l	34516	ND	0.5
etrachloroethene	ug/l	34475	<0.5	0.5
oluene	ug/l	34010	ND	0.1
,1,1-Trichloroethane	ug/l	34506	ND	0.5
,1,2-Trichloroethane	ug/l	34511	ND	0.5
richloroethene	ug/l	39180	ND	0.5
richlorofluoromethane	ug/l	34488	ND	0.5
inyl chloride	ug/l	39175	ND	0.5
ylenes	ug/l	81551	ND	0.1

Note any unidentified peaks below

hloropicrin	ug/l	ND	5.0
DBCP	ug/l	ND	5.0
1, 3 Trichloropropane	ug/l	ND	0.5
cis 1, 2 dichloroethene	ug/l	ND	0.5

SE SD
DLB-5/

O. J. ROGERS

JAN 15 1985

JAN 15 1985

PURGEABLE ORGANIC ANALYSES
(VOLATILES)

LABORATORY NAME: DWP - Water Quality	REPORT PREPARED BY: (SIGNATURE) F. Bordey	DATE OF REPORT: 1-10-85
SYSTEM NAME:		NUMBER: 05437
WELL NAME AND/OR NUMBER:	STATE WELL NUMBER:	
DESCRIPTION OF SAMPLING POINT: Mc Bride (4898)		
NAME OF SAMPLER: Peter R.	SAMPLER EMPLOYED BY: DWP	
DATE/TIME SAMPLE COLLECTED: 12-20-84	DATE/TIME SAMPLE RECEIVED @ LAB: 12-20-84	DATE ANALYSES COMPLETED: 12-28-84
TEST METHODS: GC/MS	Were all the constituents listed below quantified? Yes	

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
Benzene	ug/l	34030	ND	0.1
Bromodichloromethane	ug/l	32101	ND	0.5
Bromoform	ug/l	32104	ND	1.0
F omethane	ug/l	34413	ND	0.5
Ca n tetrachloride	ug/l	32102	ND	0.5
Chlorobenzene	ug/l	34301	ND	0.1
Chloroethane	ug/l	34311	ND	0.5
2-Chloroethylvinyl ether	ug/l	34576	ND	3.0
Chloroform	ug/l	32106	ND	0.5
Chloromethane	ug/l	34418	ND	0.5
bis (2-Chloroethyl) ether	ug/l	34273	ND	50.
Dibromochloromethane	ug/l	32105	ND	1.0
1,2-Dichlorobenzene	ug/l	34536	ND	0.5
1,3-Dichlorobenzene	ug/l	34566	ND	0.5
1,4-Dichlorobenzene	ug/l	34571	ND	0.5
Dichlorodifluoromethane	ug/l	34668	ND	40.
1,1-Dichloroethane	ug/l	34496	ND	0.5
1,2-Dichloroethane	ug/l	34531	ND	0.5
1,1-Dichloroethene	ug/l	34501	ND	0.5
trans-1,2-Dichloroethene	ug/l	34546	ND	0.5
1 -Dichloropropane	ug/l	34541	ND	0.5
cis .,3-Dichloropropene	ug/l	34704	ND	0.5

URGEABLE ORGANIC ANALYSES (Continued)

CONSTITUENT	REPORTING UNITS	STORET CODE	ANALYSES RESULTS	DETECTION LIMIT
rans-1,3-Dichloropropene	ug/l	34699	ND	0.5
thy enzene	ug/l	34371	ND	0.5
ethylene chloride	ug/l	34423	ND	0.5
ethyl Ethyl Ketone	ug/l	81595	ND	10.
ethyl Isobutyl Ketone	ug/l	81596	ND	3.0
,1,2,2-Tetrachloroethane	ug/l	34516	ND	1.0
etrachloroethene	ug/l	34475	ND	0.5
oluene	ug/l	34010	ND	0.1
1,1,1-Trichloroethane	ug/l	34506	ND	0.5
1,1,2-Trichloroethane	ug/l	34511	ND	1.0
Trichloroethene	ug/l	39180	ND	0.5
Trichlorofluoromethane	ug/l	34488	ND	0.5
Vinyl chloride	ug/l	39175	ND	0.5
ylenes	ug/l	81551	ND	0.1

Note any unidentified peaks below

Chloropicrin	ug/l	ND	5.0
BCP	ug/l	ND	5.0

SEB-SD
DLB-5/84

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received	11-8-84
Lab. No. (Leave Blank)	13588
Purveyor and Address (include city and county)	Valley Reclamation-Hewitt Pit
System Number	
Serial Number	C 07970
Sampling Point	New Well #1 - West
Collected by	Ramstedt
Date and Hour Collected	11-8-84 1215

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Obs Well

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS: ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids
(mg/l as Ca CO_3): ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):
VOA
see attached sheet

Date Reported: 11-9-84
Analyst: P.H.

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4
☐ Spec. Cond. μmhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

State of California - Department of Health Services
Sanitation and Radiation Laboratory Section
Southern California Laboratory Section
SAMPLE FOR CHEMICAL ANALYSIS

Date Received	11-8-84
Lab. No. (Leave Blank)	13589
Purveyor and Address (include city and county)	Valley Reclamation Hewitt Pit
System Number	
Serial Number	C 07974
Sampling Point	Trip Blank
Collected by	Lab - (ECR)
Date and Hour Collected	11-8-84 1130

Type of Sample: ☐ Raw Surface Water ☐ Drinking Water ☐ Raw ☐ Treated ☐ Waste water: ☐ Raw ☐ Chlorinated ☐ Trade Waste ☑ Other Trip Blank

Send Report To: ☐ WSS Dist. # ☐ DOT Dist. # ☑ RWQCB # 4 ☐ County HD ☐ National Park Serv. ☐ Other

Results are expressed as mg/l unless specified

☐ GENERAL MINERAL ANALYSIS: ☐ Ca ☐ Mg ☐ Fe Total ☐ Mn ☐ Na ☐ K ☐ pH ☐ Total Dissolved Solids
(mg/l as Ca CO_3): ☐ Hardness ☐ HCO_3 ☐ CO_3 ☐ OH ☐ Total Alk. ☐ Cl ☐ SO_4 ☐ F ☐ NO_3

TRACE ELEMENTS: ☐ Al ☐ Ag ☐ As ☐ B ☐ Cd ☐ Cr ☐ Cu ☐ Hg ☐ Pb ☐ Ni ☐ Se ☐ Zn ☐

☑ Other analyses desired (specify):
VOA
chloropropene isomer
toluene = 0.25 ug/l

Date Reported: 11-9-84
Analyst: P.H.

☐ Turb. TU ☐ NH_3-N ☐ BOD ☐ Susp. Solids ☐ PO_4
☐ Spec. Cond. μmhos/cm ☐ ORG-N ☐ Grease ☐ Set Solids ml/l/hour ☐ MBAS

Form LAB-800 (2-80)

DEPARTMENT OF HEALTH SERVICES
PUBLIC AND ENVIRONMENTAL HE[illegible]TH DIVISION (213) 620-3376

SOUTHERN CALIFORNIA LABORATORY SECTION
1449 West Temple Street, Room 101
Los Angeles, California 90026

AN ATTACHMENT TO LAB-804

SAMPLES FOR CHEMICAL ANALYSIS

HEWITT PIT
NEW WELL #1

LAB NUMBER: 13588

SERIAL NUMBER: C 079 70

ANALYST: P.A.

DATE REPORTED: 11-9-84

VOA

1. n-pentane
2. Petroleum distillate hydrocarbon C_6
3. Dipropyl ether
4. Benzene = 0.54 ug/l
5. toluene = 7.2 ug/l
6. Perchloroethylene = 1.9 ug/l
7. Ethyl benzene = 2.3 ug/l
8. M,P-Xylenes = 9.8 ug/l
9. O-Xylene = 3.4 ug/l
10. n-propyl benzene = trace
11. Ethyl toluene isomers
12. trimethyl benzene isomers
13. 3A,4,7,7A-tetrahydro-4,7-methanoindene
14. Indan